

ECONOMIC DEVELOPMENT AND CULTURAL CHANGE

SUPPLEMENT TO VOLUME V • NUMBER 4 • JULY 1957

QUANTITATIVE ASPECTS OF THE ECONOMIC GROWTH OF NATIONS

II. Industrial Distribution of National Product and Labor Force

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by

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July 1957

Entered as second class matter at the post office at Chicago, Illinois

I. Introduction

This second paper in a series on quantitative aspects of economic growth deals with the levels and trends of the shares of major industrial sectors in national product and labor force. It initiates a comparative analysis of components of national product, supplementing that of national product, total and per capita, presented in the first paper.¹

Analysis focused upon the components raises difficulties and is subject to qualifications additional to those characterizing the analysis of the country-wide totals. For one thing, the questions to be answered are more specific; and the inadequacies in the supply of basic statistical data may mean a larger margin of error in the analysis. For those countries for which the estimates of national product are based largely on data relating to income received by individuals with no clear indication of industrial attachment, an analysis of industrial distribution is impossible. Even when data on industrial distribution are available and used in deriving the national product totals, the errors of estimate for some industrial sectors may be far wider than for the countrywide aggregates, because the basic data for the former are more meager and less reliable. Comparison between any two industrial sectors is affected by the errors of estimate in both--wide or narrow. It may therefore be taken as a general rule that the comparative analysis of components is subject to wider statistical error than the analysis of the aggregative totals.

But this additional qualification resulting from the greater scarcity and unreliability of the underlying data is perhaps not as important as the additional conceptual difficulties involved. The components--in the present case the industrial sectors of the economy--are interrelated parts of an integrated system. It is far easier to define and perceive the product of, or the labor force attached to, such a countrywide system than to define the product of, or labor force attached to, each industrial sector.

The difficulties can be illustrated by consideration of industrial attachment of the labor force. First, there is the obvious case of multiple attachment. Many workers, through the year or some other reasonably defined time period, are employed in more than one industrial sector--e.g., migratory workers employed partly in agriculture and partly in urban industries; or even non-migratory workers in the countryside who work partly in agriculture and partly in local plants with seasonal peaks (canneries, etc.). In the countrywide estimate no problem arises; but in the industrial distribution one does. We cannot split the workers into parts--that is an almost insuperable task statistically--but must assign them to some one industry. Should that be the one from which the major share of annual

1. See Economic Development and Cultural Change, October 1956, Vol. V, No. 1. This paper, like the others in the series, draws heavily upon work in the field initiated under the auspices of the Committee on Economic Growth of the Social Sciences Research Council. Miss Lillian Epstein provided continued and valuable assistance in preparing the tables and editing the text.

income is derived? If the industrial sectors were separate and distinct, with no overlapping or mobility--the situation that can be assumed for national economies--this difficulty would not arise.

Another difficulty relates to the treatment of unpaid family labor. While this question also affects the countrywide definition of the labor force, it is far more important in inter-industry comparisons within a country than in international comparisons. Since unpaid family labor is far more prevalent in some industrial sectors (such as agriculture) than in others, the quantitative effect of its inclusion or exclusion on comparisons between agriculture, on the one hand, and non-agricultural sectors, on the other, is likely to be substantial--particularly for countries in which agriculture is not yet industrialized but the non-agricultural sectors have adopted modern technological practices.

These problems become more complex when we deal with the industrial distribution of national product, since it involves attribution of value weights. The share in national product of a given industrial sector is ordinarily estimated either as the sum of compensation of factors of production engaged in it (wages, salaries, entrepreneurial income, corporate net income, property income payments), or as the difference between its gross value of product and payments made to other sectors in the economy. In either case, the estimate may be affected by a type of distortion in the price weights used in valuation that is not as serious in the estimation of aggregate product. To illustrate, if monopolistic conditions in an industrial sector result in the compensation of factors in it far above what they would secure otherwise, this sector is assigned a larger share of national product; and comparison of this share with the share of the same sector in another country where such monopolistic conditions do not prevail would suggest a greater contribution--whereas in real terms this is not a fact. Likewise, if in the course of time internal "terms of trade" are favorable to a given industrial sector, i. e., if the prices it pays for materials and other purchases from other industries decline more or rise less than the prices it charges for its product, the share of that sector in the countrywide total will increase--even though in quantity terms no such rise has occurred. And while theoretically both difficulties can be handled by differential price adjustments, the necessary details, like those for an exact apportionment of the labor force, are so demanding that in practice no such adjustments are feasible on a scale adequate for sufficiently wide comparisons over space or time.

Questions and problems of the type suggested can easily be multiplied. But there is no point to discussing them in advance; they will be noted in connection with the presentation and evaluation of statistical findings below. They are mentioned here as advance warning that the findings are subject to wider errors than those for countrywide totals; and that here, even more than elsewhere, only major differences and trends warrant attention.

In the discussion that follows we deal first with the industrial distribution of national product. Our primary interest is, of course, the long-term trend in this distribution, associated with the economic growth of nations, but we can use in this connection the far larger stock of data available for current years for a large number of countries. Cross-section analysis of international similarities and differences in the industrial distribution of national product, when associated with levels of national product per capita, can suggest a preliminary hypothesis as to the change in the industrial distribution of product in the process of growth, i. e., with an increase over time in product per capita. For this reason we begin with the international comparisons for recent years, and then pass on to the direct evidence--for a much smaller number of countries--on long-term changes.

In the next section the same sequence--from a cross-section view to direct examination of long-term trends--is followed in the analysis of the industrial distribution of the labor force. And in the third section, the inter-industrial differences in level of product per worker, which can be derived from the distributions of national product and labor force, are studied along similar lines.

In the last section we use the findings to study the effects of differences in the industrial distribution of the labor force and in levels of product per worker in the different industrial sectors on differences in aggregate product per worker. Here too both cross-section analysis and movement over time are analyzed.

II. Industrial Distribution of National Product

A. International differences for recent years.

The basic data are shares of major industrial sectors in the national product for a large number of countries, mostly for post-World War II years. These are given in Appendix Table 1 and provide the raw material for the summary tables in the text.

We deal first with three major sectors of the industrial distribution: agriculture and such related industries as fisheries and forestry (to be referred to, for brevity, as the A-sector); mining, manufacturing, and construction (the M-sector); and all the service industries: transportation and communication, trade, finance, professional, personal, and business services, and government (the S-sector). We decided to put mining in the M-sector because, even though it is an extractive industry, its technology is free from the limiting effects of biological and climatic factors (unlike that of agriculture); and because its economic organization--large impersonal corporations--is far more similar to that of the other industries in the M-sector than to that of the A-sector.

Second, data are available for the largest number of countries for post-World War II years; and averages for the longest period possible were secured. The earliest year covered was 1947--to eliminate much of the peculiar conditions of the recovery processes that immediately followed the close of hostilities; the period was as long as possible to cancel, wholly or largely, any effects of transient factors. For some countries, we also had data for some pre-World War II year, usually 1938. Comparison of entries for this year with those for the post-World War II period (see Appendix Table 1) reveals no major differences in the shares. We therefore felt justified in adding to the countries with distributions for the post-World War II period a few countries for which distributions could be found only for a year shortly before World War II; and in the tables in the text we summarize the findings for all the countries. While some heterogeneity is thus introduced the advantage gained in extending the scope of comparison more than outweighs the disadvantage introduced by the minor element of incomparability.

Third, the total distributed by major industrial sectors is for most countries net domestic product; but for some it is national income, and for others gross domestic product. However, the differences in the industrial distributions of these variants of countrywide output are so minor, compared with the international differences or the errors of estimation, that this element of incomparability can be safely ignored. By contrast, the differences between the concepts used in the Communist countries and in others may have a sizable effect on the industrial distribution. When Marxian concepts are followed, services not

embodied in commodities are theoretically excluded.² For this reason, the few countries in which there is ground to suspect the effects of the Marxian concept on the industrial distributions are usually excluded from the summary text tables; or if they are included, two sets of averages are shown so that the effect of inclusion can be seen.

Fourth, the percentage shares of the various sectors in national product are calculated on the basis of estimates in current, unadjusted prices. In this cross-section analysis at a point of time, it is not the "currency" but the unadjusted character of the prices that matters. As suggested above, it would theoretically be possible to adjust compensation of comparable factor units in several sectors for differences in their prices due to mere differences in monopoly power or other elements of non-mobility and stickiness. It is, for example, known that prices of identical factors differ between the city and the countryside; and that adjustment for them would change the distribution between the agricultural and the other two sectors. But no such adjustment is feasible except by detailed analysis for a few countries; and the failure to carry it through will qualify our interpretation of some of the findings below.

Fifth, in selecting the countries for comparison we were naturally limited to those for which data were easily available. But we omitted from the summary tables all units with population of less than a million in the post-World War II period. Our reason for excluding them was that the small groups involved (e.g., Luxembourg or Cyprus, for which the data were available) may be enclaves that are integral parts of larger entities; and in such cases, their industrial structure may well display peculiarities that would not, and could not, be true of larger and more self-contained and independent countries. To be sure, no country, no matter how large its population, is entirely independent and economically self-contained; but we felt that some limit in this respect had to be drawn, and the minimum size was a rough and arbitrary approximation to this limit. On the other hand, we included dependent territories that met the criterion of minimum population on the ground that the availability of separate data is an indication of the existence of a separate economic entity whose limited legal sovereignty introduces no major elements of incomparability with sovereign states.

Finally, the international differences in the industrial structure of national product are of interest here largely in association with international differences in product per capita, which we take as a rough approximation to the level of economic development. Assuming that we have data for national product per capita, in comparable units, for the countries and periods for which we have data on the industrial structure of national product, the association can be studied in various ways--ranging from the exacting and sensitive methods of least squares correlation to the somewhat less demanding measures of rank correlation, to even simpler methods of observing the association. We chose the simplest methods because the imprecise character of the estimates of both variables and the nature of the underlying universe did not warrant the application of least squares correlation techniques and because the rank correlation measures would be perhaps less valuable than the more direct comparisons.

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2. Actually, however, many activities, which in the non-Marxian measurement would be classified under service industries, are merged into commodity production. For example, physicians in Communist countries are attached to industrial plants and their income is charged to the cost of commodities, whereas in other countries the income of physicians is product originating in the service sector.

The technique used throughout this paper was to group all countries into seven classes, designated by Roman numerals. Class I includes countries with the highest per capita income; Class II includes countries with somewhat lower levels; and so on down to Class VII. For this classification we used largely the United Nations estimates of per capita income in United States dollars both for 1949 and for later years.³ In general, we tried to draw division lines so that each class included a sufficient number of countries, to prevent erratic variations in the averages; the numbers of countries ranged from 8 in the smallest class to 14 in the largest. In some of the summary tables we combined contiguous classes to avoid averages or distributions based upon too few countries. The range in per capita income among the seven classes is quite wide. A rough index of average per capita income for each class (in U. S. dollars), expressed in terms of 100 for Class VII is: I--1,700; II--1,000; III--650; IV--400; V--270; VI--200; VII--100 (all countries, regardless of size, were given the same weight in deriving these averages). This range may exaggerate differences in real purchasing power of per capita income, since there is a general bias in this direction in international comparisons; but the index is sufficiently reliable to indicate that there is a sizable relative difference in real per capita income among the seven classes.

The decisions described above as to the choice of countries, period, data, and methods of studying the association between the industrial structure and relative level of product per capita, clearly contain arbitrary elements; and other scholars may prefer to make different decisions. It is partly for this reason that the underlying data are given in some detail in the appendix tables. But some such decisions had to be made to permit an orderly summary of the available evidence, and the ones made here seemed most reasonable at the present state of analysis. If the analysis indicates promising directions for further refinement, new ways of treating the data may then become apparent.

We can now turn to examination of the data. In Table 1, which excludes the few Communist countries, the countries are classified by the percentage shares of the three major industrial sectors and the distributions are given for all countries as a whole and for some subdivisions based on the Roman numeral classes (henceforth referred to as economic level classes).

(1) The fifty-nine countries for which the share of the A-sector in national product in recent years can be measured are widely distributed among the size-of-share classes. In only three countries is the share of agriculture in total product less than 10 percent, but above this low level, each size-of-share class has a substantial number of countries.

For the fifty-seven countries for which the share of the M-sector can be measured, the distribution is not as widespread. Yet in the range from 10 to 50 percent, each size-of-share class has a number of countries.

3. The estimates for 1950-54 were prepared for internal use by the Secretariat of the United Nations and kindly made available by Dr. William Leonard of the Statistical Office. Much of this material was published recently in Per Capita National Product of Fifty-Five Countries: 1952-1954, United Nations Statistical Papers, Series E, No. 4, 1957; and by Dr. J. B. D. Derksen in Statistische en econometrische onderzoeken, 3rd Quarter 1956 (Central Bureau of Statistics, Netherlands), pp. 113-126. The 1949 estimates are in National and Per Capita Incomes, Seventy Countries, 1949, United Nations Statistical Papers, Series E, No. 1, 1950. In addition, we used, when needed, specific estimates for individual countries or areas.

Table 1 Distribution of Countries by Shares of Major Sectors in National Product, Recent Years (excluding Communist Countries)

Economic Level Classes	Percentage Share Classes						Total
	Less than 10	10-19	20-29	30-39	40-49	50 & over	
By Share of Agriculture (A)							
I & II	3	7	3	0	0	0	13
III & IV	0	8	1	3	2	0	14
V	0	0*	4	0	3	1	8
VI	0	0	1	5	2	3	11
VII	0	0	0	1	3	9	13
Total	3	15	9	9	10	13	59
By Share of Manufacturing, Mining, & Construction (M)							
I & II	0	0	2	4	6	1	13
III & IV	0	5	6	2	1	0	14
V	0	2	4	2	0	0	8
VI	1	5	3	1	0	0	10
VII	3	8	0	1	0	0	12
Total	4	20	15	10	7	1	57
By Share of Services (S)							
I & II	0	0	0	3	8	2	13
III & IV	0	0	0	5	3	6	14
V	0	0	0	5	2	1	8
VI	0	0	1	5	3	1	10
VII	0	0	2	9	1	0	12
Total	0	0	3	27	17	10	57

Derived from Appendix Table 1.

The distribution of countries by the size of the share of the S-sector is somewhat unexpected and distinctive. Here in no country is the share below 20 percent--whereas in 18 out of 59 countries the share of the A-sector and in 24 out of 57 countries the share of the M-sector were below 20 percent. The contrast becomes even sharper when we draw the line at 30 percent: in only 3 out of 57 countries is the share of the S-sector below 30 percent, whereas this is true of 27 out of 59 countries for the share of the A-sector and of 39 out of 57 countries for the share of the M-sector. On the other hand, fewer countries fall into the highest size-of-share class in the distribution for the S-sector than in that for the A-sector--10 out of 57 compared with 13 out of 59.

(2) This conclusion can be stated somewhat differently. The distribution of countries by the share of the S-sector is far more concentrated, i.e., compressed within narrower limits, than are the distributions by the shares of the other two sectors. Thus, in 44 out of 57 countries the share of the S-sector varies from 30 to 50 percent, a range of only 20 percentage points. The loosest parallel for the M-sector is the range for 45 out of 57 countries, from 10 to 40 percent, or 30 percentage points; and for the A-sector of either 43 countries with a range from 10 to 50 percent or 41 countries with a range from 20 to over 50 percent.

This impression of greater concentration in the distribution of countries by the share of the S-sector is confirmed by the measures assembled in Table 2.

Table 2 Medians and Quartiles in the Distribution of Countries by Shares of Major Sectors in National Product, Recent Years (excluding Communist Countries)

Partition Lines (arith. means of 3 items)	Distributions Based Upon Shares of		
	A (1)	M (2)	S (3)
1 Median	33.9	21.6	39.7
2 Lowest	7.0	7.1	25.2
3 First Quartile	18.0	15.8	34.5
4 Third Quartile	48.7	35.6	47.8
5 Highest	68.3	50.9	63.0
6 Interquartile range (4-3)	30.7	19.8	13.3
7 Ratio of 6 to 1	0.91	0.92	0.34
8 Full range (5-2)	61.3	43.8	37.8
9 Ratio of 8 to 1	1.81	2.03	0.95

Derived from Appendix Table 1.

By arraying countries in increasing order of the share of each sector, we can establish the medians and other partition values. To minimize erratic results, we used arithmetic means of three values rather than single values, i.e., of the three lowest, three centered around the first quartile, and so on. Even the absolute ranges in the distribution by the share of the S-sector are narrower than those in the distribution by shares of the A- and M-sectors. When measured in relation to the median, dispersion is far more limited.

(3) Turning now to the economic level classes, we observe a drift toward the right in the distribution based on the share of the A-sector: as the level of per capita income drops, the share of agriculture in national product rises. By contrast, in the distribution by the share of the M-sector, the drift is toward the left: the lower the level of per capita income, the lower the share of the M-sector in national product. These findings confirm the well-known negative correlation between the level of income and the share of agriculture, and positive correlation between the level of income and the share of non-agricultural commodity production.

The real question concerns the distribution by the share of services--in view of the narrower range observed. In the bottom panel of Table 1 there is some evidence of a drift to the left: the lower the level of per capita income, the lower the share of the S-sector in national product. But the drift is far from pronounced; and one can only infer that if the correlation between level of income and the share of the S-sector is positive, it is far weaker than that for the M-sector and has limited significance.

In view of the interest of these associations, it seemed worth while to go further. Within each economic level class, we calculated the average shares of the three major sectors. In other words, we averaged the shares of the A-sector, the M-sector, and the S-sector for the seven countries included in Class I; and did the same for countries in Classes II-VII (Table 3).

The averages are unweighted arithmetic means, i.e., the percentage shares for all the countries are given equal weight, regardless of the wide differences in

Table 3 Arithmetic Means of Shares of Major Sectors in National Product, by Groups of Countries Classified by Per Capita Economic Level, Recent Years

Economic Level Classes	Number of Countries (1)	Average Shares of		
		A (2)	M (3)	S (4)
I	7	13.2	38.1	48.7
II	6(7)	17.2(18.5)	41.5(38.5)	41.2(43.1)
I & II	13(14)	15.1(15.8)	39.7(38.3)	45.2(45.9)
III	6(7)	19.2(19.8)	29.2(31.8)	51.6(48.4)
IV	8(9)	30.1(30.5)	24.2(25.7)	45.7(43.7)
III & IV	14(16)	25.4(25.8)	26.4(28.4)	48.2(45.8)
V	8(10)	35.4(35.4)	24.3(26.4)	40.2(38.2)
VI	10-11	42.5	17.8	39.3
VII	12-13	54.6	13.7	33.3
V, VI, & VII	30-32	45.6	17.9	37.2

Derived from Appendix Table 1.

Figures in parentheses include Communist countries.

The entries in Column 1 indicate the smallest and largest number of countries represented in the average shares.

the magnitude of their bases. Theoretically it is possible to convert the totals and components for all the countries in a given class to a common denominator, add all the subtotals for each sector, and then calculate a weighted share of the sector aggregate in the aggregate product for that class. If this had been done, the United States would have exercised much greater effect on the averages for Class I than Sweden or Switzerland, which fall into the same class. But conversion to a common base necessary for such weighting is not easy, and the rationale for the weights to be used is rather doubtful. We preferred to treat each country as a single case representative of a specific level of economic attainment, regardless of whether it was a large nation or a small country. Arithmetic means were used rather than geometric means, which are more appropriate for ratios, because the sum of the averages of the three sectors for each economic level class equals 100;⁴ whereas the use of geometric means would have required an additional arbitrary adjustment for this result.

(4) The average share of agriculture in national product rises fairly steadily as we move down from Class I, with the highest per capita income, to Class VII, with the lowest per capita income. Inclusion of the Communist countries modifies the averages only slightly, and has no effect on the steady progression in the negative association.

The share of the M-sector in total product declines fairly steadily as the economic level drops. One interruption is a higher average share for the M-sector

4. This is true if identical countries are used for the class means of all three sectors. But the argument holds for slight departures from this condition, as is indicated in the closeness with which the sum of the means for the three sectors (in Table 3) approaches 100 in each economic level class.

in Class II than in Class I, and this may be because the former is dominated by highly industrialized countries like Germany and Belgium, which do not necessarily have the top per capita income. Another exception is in the movement of the share from Class IV to Class V. But both exceptions are minor qualifications of the positive association between per capita income level and the share of the M-sector in total product, which is pronounced and continuous.

The movement of the share of the S-sector is less familiar and more unexpected. Here the average remains at a high level, above 40 percent, for Classes I through V; and within this range there is no evidence of any association between the level of income per capita and the share of the S-sector in total product. There is some decline in the transition from Class IV to Class V, but the average share for the latter is not significantly lower than for Class II. It must be remembered that the index of per capita product ranges from 1700 for Class I to 270 for Class V. It is only in the shift to Classes VI and VII that the share of the S-sector drops significantly; and it is only in the difference between the shares for Classes I-V on the one hand and those for Classes VI and VII on the other that there is a vestige of positive association between the level of per capita product and the share of the S-sector.

This finding can be explored further by utilizing data for a smaller number of countries on the shares of some subdivisions of the S-sector. This additional breakdown permits us to distinguish transport and communication, trade, and all other, which unfortunately is still a mixed category, comprising as it does finance, personal and domestic service, professional service, and government. Naturally, these data are subject to somewhat wider errors, but the additional insight provided justifies pressing in this direction.

Table 4 provides a distribution of countries by size-of-share classes for these three subdivisions and for a fourth, which combines transportation and communication and trade. This additional combination is presented because for a number of countries data are available for it, but not for its two subcomponents separately.

(5) In general, the share of transportation and communication is fairly low--less than 10 percent of national product. Since the size-of-share classes had to be set at fairly wide intervals for comparative purposes, it is impossible to judge the degree of concentration in the distribution of countries by the share of the transportation and communication subdivision.

But this can be done for the distribution by the shares of trade and of other services. In the former, for 32 out of 46 countries, the share varies from 10 to 20 percent, a range of only 10 percentage points. The concentration in the distribution of countries by the share of other services is only slightly less marked: for 38 out of the 51 countries the share varies from 15 to 30 percent, a range of 15 percentage points. It would appear that the concentration in the distribution by the share of the S-sector observed in connection with Table 1 can also be found in the distributions by the share of trade and of other services, particularly the former.

This impression can be checked by calculating the medians and the measures of dispersion described above. (Table 5). Relative dispersion, as measured by the ratio of the interquartile range to the median, is narrower for each of the four distributions here than for the distributions by the share of either the A- or the M-sector. The same is true even of the more erratic ratio, of the full range to the median--with the distribution by the share of trade plus transportation and

Table 4 Distribution of Countries by Shares of Service Industries in National Product, Recent Years (excluding Communist Countries)

Economic Level Classes	Percentage Share Classes							Total
	Less							
	than 5	5-9	10-14	15-19	20-24	25-29	30 & over	
By Share of Transportation and Public Utilities (T)								
I & II	0	6	5	0	0	0	0	11
III & IV	3	9	1	0	0	0	0	13
V & VI	5	6	1	0	0	0	0	12
VII	9	2	0	0	0	0	0	11
Total	17	23	7	0	0	0	0	47
By Share of Trade (C)								
I & II	0	1	6	2	0	0	0	9
III & IV	0	2	7	2	0	1	1	13
V & VI	0	3	7	4	0	0	0	14
VII	0	4	2	2	1	1	0	10
Total	0	10	22	10	1	2	1	46
By Share of Transportation and Trade (T + C)								
I & II	0	0	0	2	5	3	0	10
III & IV	0	0	0	5	6	1	2	14
V & VI	0	1	1	6	6	0	0	14
VII	0	1	2	6	1	2	0	12
Total	0	2	3	19	18	6	2	50
By Share of Other Services (OS)								
I & II	0	0	1	3	2	4	0	10
III & IV	0	0	1	3	3	4	3	14
V & VI	0	0	1	5	4	3	2	15
VII	0	2	3	4	3	0	0	12
Total	0	2	6	15	12	11	5	51

Derived from Appendix Table 1.

Table 5 Medians and Quartiles in the Distribution of Countries by Shares of Service Industries in National Product, Recent Years (excluding Communist Countries)

Partition Lines (arith. means of 3 or 4 items)	Distributions Based Upon Share of			
	T (1)	C (2)	T+C (3)	OS (4)
1 Median	6.7	12.8	20.0	20.8
2 Lowest	1.0	7.2	8.6	8.1
3 First quartile	3.2	10.3	16.3	16.8
4 Third quartile	8.6	16.0	23.8	26.1
5 Highest	13.4	29.7	33.8	37.5
6 Interquartile range (4-3)	5.4	5.7	7.5	9.3
7 Ratio of 6 to 1	0.81	0.45	0.38	0.45
8 Full range (5-2)	12.4	22.5	25.2	29.4
9 Ratio of 8 to 1	1.85	1.76	1.26	1.41

Derived from Appendix Table 1.

and communication showing particularly limited dispersion. Finally, the dispersion in the distributions by the shares of the two major subdivisions of the S-sector is wider than that by the share of the total S-sector (Columns 3 and 4 of Table 5 compared with Column 3 of Table 2): obviously, relatively larger shares of one subdivision tend to be offset by relatively smaller shares of the other. A similar impression is conveyed by a comparison of the dispersion measures in the distribution by the share of transportation and trade combined with the separate distributions by the shares of transportation and communication, and trade (Column 3 compared with Columns 1 and 2).

(6) Despite the crudity of the size-of-share classes used, the distribution of countries by the share of transportation and communication can be clearly observed to drift toward the left (top panel of Table 4). In other words, the lower the per capita product, the lower the share of transportation and communication in total product.

No such drift can be observed in the distribution of countries by the share of trade; and only very limited indication of a drift toward the left can be found in the distribution by the share of other services (second and fourth panels of Table 4). Any association between the level of product per capita and the shares of commerce and of other services in total product must be weak indeed.

These associations, suggested by the distributions in Table 4, are tested by calculating arithmetic means of shares for the successive economic level classes (Table 6).

Table 6 Arithmetic Means of Shares of Service Industries in National Product by Groups of Countries Classified by Per Capita Economic Level, Recent Years (excluding Communist Countries)

Economic Level Classes	No. of Countries (1)	Average Shares of			
		T (2)	C (3)	T+C (4)	OS (5)
I	4-6	9.5	14.1	23.6	26.6
II	5-6	9.9	12.7	22.3	18.9
I & II	9-11	9.7	13.3	22.8	22.0
III	5-6	8.4	14.3	21.6	30.0
IV	8	6.7	16.7	23.4	22.3
III & IV	13-14	7.4	15.7	22.6	25.6
V	4-6	8.2	13.5	21.4	20.4
VI	8-9	4.4	12.1	15.9	23.4
V & VI	12-15	5.6	12.6	17.8	22.2
VII	10-12	3.3	14.4	17.6	15.7
V, VI, & VII	26-27			17.7	19.3

Derived from Appendix Table 1.

The entries in Column 1 indicate the smallest and largest number of countries represented in the average shares.

(7) The association between the level of per capita income and the share of total product accounted for by transportation and communication is marked and

positive: the share drops fairly steadily, particularly for combined contiguous classes. And the decline is quite marked, the average in Class VII being about a third of that in the combined Classes I and II.

No such association is observed between the level of per capita product and the share of commerce in total product. Indeed, the average share for Class VII is higher than that for Class I. The only conclusion that can be drawn is that the share of trade in total product is invariant to the level of product per capita, and is as high in underdeveloped as in developed countries.

The association for the share of other services is not unlike that observed in Table 3 for the share of the S-sector as a whole. By and large, it shows no definite movement upward or downward for the range from Class I through Class VI. Only in Class VII is the share significantly lower.

Since we hope to derive from these findings some hypotheses for long-term trends in the industrial structure of national product in the process of economic growth, we must have at least a tentative rationale for these findings. We need not concern ourselves with explanations of the negative correlation between product per capita and the share of the A-sector; or of the positive correlation between product per capita and the share of the M-sector; these are well-known findings and adequate hypotheses have already been advanced for them. The two relatively new findings that require some explanation are (a) the concentration in the distribution by the share of the S-sector in general, and by those of commerce and of other services in particular--compared with the much more dispersed distributions by the shares of the A- and the M-sectors; (b) the absence of significant positive correlation between the level of product per capita and the share of the S-sector in general, and of those of trade and other services, in particular.

(a) It seems obvious that the products of the A- and the M-sectors can move far more easily in the channels of international trade than the products of the S-sector. To be sure, services rendered in the way of transportation and communication, or trade, or government, whose costs are embodied in the value of commodities, are exported; and to a limited extent some services not embodied in commodities can be exported. But it is also true that a wide variety of services cannot be exported; almost all personal services, including domestic; transportation and communication within a country; most professional services; and practically all government services. By contrast, all commodities except the most perishable and those for which the cost of transportation relative to original cost is prohibitive can move freely. For this reason a country can produce agricultural products that account for only a small percentage of its total output, and yet consume agricultural products that are a far larger share of its total expenditures--the balance being covered by imports; and for the same reason manufactured goods consumed by a country can constitute a much larger share of total product than those produced within the country. The well-known patterns of imports and exports of industrialized countries explain the wide range in the distribution of countries by the share of either the A- or the M-sector. Since most services cannot be imported, the minimum share of the S-sector that must be produced at home appears to be much higher.

The lesser susceptibility of services to movement across national boundaries is due partly to technological, partly to cultural, partly to political factors. Where services require close contiguity between their producer and consumer, provision via imports would require a corps of international commuters whose costs of transportation would be prohibitively high--compared with the provision of such

services by residents of the consuming country. Then there are the cultural factors: many services have to be performed in the language and within the mores of the country, whereas many commodities are fairly standardized and hence require no major "cultural" conditioning that would add tremendously to their cost. Finally, because of political factors, most government and many related services must be performed by the citizens of the country itself.

Second, as suggested below, the elasticity of response to different levels of per capita income may be far lower for services as a whole than for the products of either the A- or the M-sector. When income is high, the proportion spent on the products of agriculture tends to be low--and the range in the proportion can be quite wide as is evidenced by so many budget studies. The complement of this Engel law is that the proportion spent on products of the M-sector varies widely in positive response to differences in levels of per capita income. This is not true of the demand for services as a whole, particularly in international comparisons. In developed countries large proportions of income may be spent on certain types of services--professional, recreation, business, and the like; but small proportions on religion, domestic service, fortune tellers, and money lenders. In underdeveloped countries the proportions of income spent on professional, educational, and recreational services may be low; but those devoted to priests, domestic servants, and money lenders may be quite high.⁵

Third, in addition to a fairly high lower limit to the share of the S-sector in total product, there is an upper limit--which means that there is a lower limit to the share of the A- and M-sectors taken together. It is difficult to visualize a country of any size with services predominating and without substantial commodity production. Such a situation is conceivable for trading or financial metropolises, and is one reason for excluding distinct areas with relatively small populations from our summaries. But in all other cases, large area means the possibility of mining and agriculture; and both the costs of obtaining commodities from abroad and the need for some exportable flow to pay for necessary imports means economic compulsion to engage a substantial proportion of resources in commodity production, i. e., in the A- or the M-sector. This necessarily sets an upper limit to the share of the residual, i. e., the S-sector.

Fourth, differential levels of compensation of resources in the several sectors--an aspect which we shall study directly below--are an additional factor. In the less developed countries with lower per capita product, where a smaller proportion of resources may be expected to be devoted to services, the compensation of some of these resources may be relatively high. In such countries commerce, finance, professional services, government represent small nuclei of economically sophisticated and highly placed urbanized social groups. The income per head which they exact, relative to that of the groups that man the A- and the M-sectors, particularly the former, may be far higher than in more developed countries. This differentially higher price level for the S-sector in countries where the proportional share of real resources engaged in this sector may be quite low would also make for a high minimum share in terms of values in current prices. On the other hand, the very dominance of the A-sector in these countries and the small share of real resources available for the S-sector is likely to limit the upper levels of its share.

5. See in this connection the illuminating paper by P. T. Bauer and B. S. Yamey in the Economic Journal, December 1951, pp. 741-755.

(b) The absence of significant positive correlation between product per capita and the share of the S-sector in total product is not a necessary statistical consequence of the limited range of the share of the S-sector: while the range is limited, international differences can still be observed, and there is no mathematical reason for the absence of correlation with the level of per capita product. But the tentative hypotheses explaining the narrow range of international differences in the share of the S-sector also suggest the factors that might explain this lack of association.

One factor may reside in the differential pricing of resources in the several sectors. If in countries with lower income levels, many of the resources in the S-sector are priced higher, relative to the countrywide average income per worker, than in countries with higher levels of product per capita, the lower shares of real resources in the S-sector in the former may be offset by their relatively higher compensation levels. To illustrate, physicians may account for x percent of all workers in the United States and only $x/2$ percent in, say, Spain, but the compensation of a physician in Spain may be y times the countrywide income per worker, whereas that of a physician in the United States may be $y/2$ times the countrywide income per worker. If so, the share of the S-sector contributed by physicians in the two countries will be exactly the same-- $xy/2$ percent--despite the fact that Spain, with lower per capita income, has a relatively lower supply of real resources in the form of physicians.

Another factor, also suggested above, may be the very heterogeneity of the S-sector: it includes services that may be relatively more plentiful in underdeveloped economies, as well as services that may be relatively more plentiful in the industrialized urbanized economies. Thus, in underdeveloped countries, with limited opportunities for productive employment, the supply of labor for personal services, and for certain types of petty trade, transportation, communication, etc., is quite large. The share of the labor force engaged in these subdivisions of the S-sector, often including government, would be larger than in the more developed countries. On the other hand, the supply of skilled professional services and of labor for the more developed divisions of transportation and communication would form a smaller proportion of total labor force in the underdeveloped countries than in those with higher levels of per capita or per worker product. There is thus an element that tends to equalize the shares of real resources engaged in the S-sector in countries at different levels of product per worker or per capita--and reduce the correlation between the two variables.

B. Long-term trends

In shifting to direct consideration of long-term trends in industrial structure of national product in the process of growth, we restate the hypothesis derived from the cross-section analysis. We would expect that with the secular rise in product per capita and per worker, the share of the A-sector in total product would decline; and the share of the M-sector would rise. No definite expectation can be entertained concerning long-term trends in the shares of the S-sector and its major subdivisions (except transport and communications, whose share we would expect to rise): they may remain constant, or they may rise in some countries and decline in others.

Table 7 summarizes the direct evidence available on long-term changes. The number of countries is far smaller than in the international comparisons for recent years. The data, for obvious reasons, are limited largely to the more

developed countries which have had an adequate supply of information for a sufficiently long period to permit study of long-term trends. Even so the available data distinguish adequately only the three major sectors, and bar the possibility of comparisons for subdivisions within the S-sector. Finally, since the data are in current prices, the possibility of shifts in internal price terms of trade among the sectors is quite substantial.

Nevertheless, several interesting conclusions are clearly suggested by the data, which have been arranged to permit observation for intervals of 30 to 40 years, with each entry, as far as possible, based upon an average for a quinquennium or a decade.

(8) In all countries, without exception, the share of the A-sector declines. These declines, which accompany the secular rise in product per capita (discussed in the earlier paper in this series), are observed not only for each country, but for each interval distinguished--whenever the available data cover a period long enough to permit division into two intervals.

(9) In all countries except the Union of South Africa and New Zealand, the share of the M-sector in total product rises; and this rise is observed for all intervals distinguished.

(10) As expected, the trends in the share of the S-sector are mixed. In six countries (the United Kingdom, Germany, the Netherlands, Norway, Sweden, and the United States) the share of the S-sector declines. In Japan according to one estimate it rises and according to the other it declines; and I have no grounds for preferring one estimate to the other. Finally, in seven countries (France, Italy, Hungary, Canada, the Union of South Africa, Australia, and New Zealand) the trends in the share of the S-sector are definitely upward.

(11) In the countries in which the share of the S-sector declines, the initial levels are quite high: over 40 percent, and in several cases over 50 percent. By contrast, in countries that show a rise in the share, the initial levels are much lower--between 20 and 30 percent--except in New Zealand, Australia, and the Union of South Africa, where they are 35, 45, and 50 percent respectively.

The direct evidence on long-term trends in the industrial structure of national product is thus remarkably consistent with that provided by the association of international differences in industrial structure and in level of per capita income. And the explanatory hypotheses are presumably the same for the decline in the share of products of the A-sector and the rise in the share of products of the M-sector as income levels rise in a given country in the long run, as they are for differences among countries or even among various income groups within a country, at a given point of time. The explanation suggested above to account for the absence, or low levels, of association between product per capita and the share of the S-sector also applies to long-term trends. One aspect of the evidence in Table 7 still to be explained is the rather high share of the S-sector in some countries in the initial phases of their records and the much lower levels of others; and the downward trend of the share of the S-sector in the former as contrasted with the upward trend in the latter. For the present we have no explanation of these differences, and it may require detailed study country by country.

Table 7 Long-Term Changes in Shares of Major Sectors in National Product, Current Prices, Fifteen Countries

		Levels of Shares (%)			Changes in Shares		
		A	M	S	A	M	S
		(1)	(2)	(3)	(4)	(5)	(6)
<u>Denmark</u>							
1	1870-79	45.1	54.9				
2	1905-14	29.1	70.9		-16.0	+16.0	
3	1947-52	19.2	80.9		-9.9	+9.9	
<u>France</u>							
4	1835	51	25	25			
5	1908-10	35	37	28	-16	+12	+3
6	1949	23	46	31	-12	+9	+3
<u>Germany (pre-World War I)</u>							
7	1860-69	32.3	24.0	43.7			
8	1905-14	18.0	38.8	43.2	-14.3	+14.8	-0.5
<u>Netherlands</u>							
9	1913	16.3	26.7	57.0			
10	1947-54	12.8	40.8	46.4	-3.5	+14.1	-10.6
<u>Norway</u>							
11	1910	23.5	25.0	51.5			
12	1950	13.7	37.5	48.8	-9.8	+12.5	-2.7
<u>Sweden</u>							
13	1869-71	43.4	15.7	40.9			
14	1909-11	26.1	35.6	38.3	-17.3	+19.9	-2.6
15	1949-51	12.9	49.9	37.2	-13.2	+14.3	-1.1
<u>United Kingdom</u>							
16	1895	9.7	36.9	53.4			
17	1948-54	5.6	46.2	48.2	-4.1	+9.3	-5.2
<u>Italy</u>							
18	1876-80	55.7	19.6	24.7			
19	1906-10	42.9	26.0	31.1	-12.8	+6.4	+6.4
20	1950-54	26.4	39.1	34.5	-16.5	+13.1	+3.4
<u>Hungary</u>							
21	1899-1901	49.0	22.8	28.2			
22	1939/40-1942/43	27.1	37.6	35.3	-21.9	+14.8	+7.1
<u>Japan</u>							
23	Ohkawa estimates						
	1878-82	64.6	10.6	24.8			
24	Ohkawa estimates						
	1908-12	42.4	21.5	36.1	-22.2	+10.9	+11.3
25	1947-54	24.4	31.5	44.1	-18.0	+10.0	+8.0
26	Yamada estimates						
	1878-82	38.0	17.6	44.4			
27	Yamada estimates						
	1908-12	37.3	25.3	37.4	-0.7	+7.7	-7.0
28	1947-54	24.4	31.5	44.1	-12.9	+6.2	+6.7

	(1)	(2)	(3)	(4)	(5)	(6)
<u>Union of South Africa</u>						
29 1911/12	16.1	34.3	49.6			
30 1944/45	11.7	34.2	54.1	- 4.4	- 0.1	+4.5
<u>Canada</u>						
31 1870	44.6	23.8	31.6			
32 1910	27.5	30.4	42.1	-17.1	+6.6	+10.5
33 1948-54	13.0	39.1	47.9	-14.5	+8.7	+5.8
<u>United States</u>						
34 1869 & 1879	20.5	21.0	58.5			
35 1904-13	17.0	26.5	56.5	- 3.5	+5.5	- 2.0
36 1947-54	7.2	37.7	55.1	- 9.8	+11.2	- 1.4
<u>Australia</u>						
37 1891	36.8	17.8	45.4			
38 1939	16.9	21.9	61.2	-19.9	+4.1	+15.8
<u>New Zealand</u>						
39 1901	47.4	17.5	35.1			
40 1936	35.0	11.9	53.1	-12.4	- 5.6	+18.0

Derived from Appendix Table 2 except for line 33, which is from Appendix Table 1

III. Industrial Distribution of the Labor Force

If the analysis of the industrial distribution of national product could have been followed by that of the industrial distribution of the several factors of production--labor, capital, and enterprise--it would have been possible to see to what extent the long-term trends in the industrial structure of national product are accounted for by trends in the distribution of real amounts of productive factors and in compensation per unit of each. But, at present, data are not available on capital and enterprise, except for a few countries; and even for those, long-term records cannot be readily assembled. However, reasonably plentiful data are available for labor--but only in the form of estimates of the labor force, a count of units taken regardless of age, sex, skill, education, and the like. Nevertheless, even such relatively crude data on a major factor of production are of interest.

A. International differences for recent years.

In studying differences in industrial distribution of the labor force, we employ two variants--the total including and excluding unpaid family labor. Neither is quite adequate: it would be preferable to include unpaid family and other auxiliary labor reduced to full-time equivalent labor units. But such an adjustment requires data which, as far as I know, are not widely available.

The identity of countries in the two variant sets of distributions differs somewhat, since for some countries the data on unpaid family labor are not given. What is more important for the present purposes, the countries included here differ somewhat from those studied in the distribution of national product. But we treat each distribution as a sample that comprises sufficient variety of countries to give a fair inkling of the kind of international differences that would be revealed in a complete list of countries with a population of over a million; and, therefore, make direct comparisons between results of analysis for the several aspects of

the industrial distribution. The alternative--limiting the distributions to those countries for which data are available on the industrial structure of both national product and labor force, and in the several variants--would reduce the sample and might reduce variability and representativeness unduly.

The distributions in Table 8 are given for 47 countries, in one variant, and for 38 in the other; those based on shares in national product in Table 1 comprise

Table 8 Distribution of Countries by Shares of Major Sectors in Labor Force, Recent Years (excluding Communist Countries)

A Including Unpaid Family Labor

Economic Level Classes	Percentage Share Classes							Total
	Less than 10	10-19	20-29	30-39	40-49	50-59	60 & over	
By Share of Agriculture (A)								
I & II	1	7	4	1	2	0	0	15
III & IV	0	1	1	4	3	2	3	14
V, VI, & VII	0	0	0	0	4	2	12	18
Total	1	8	5	5	9	4	15	47
By Share of Manufacturing, Mining, & Construction (M)								
I & II	0	1	2	8	3	1	0	15
III & IV	1	4	6	3	0	0	0	14
V, VI & VII	7	8	3	0	0	0	0	18
Total	8	13	11	11	3	1	0	47
By Share of Services (S)								
I & II	0	0	1	6	7	1	0	15
III & IV	1	1	5	3	3	1	0	14
V, VI, & VII	3	7	6	2	0	0	0	18
Total	4	8	12	11	10	2	0	47

B Excluding Unpaid Family Labor

By Share of Agriculture (A)								
I & II	1	8	2	2	0	0	0	13
III & IV	0	1	2	3	0	3	1	10
V, VI & VII	0	0	2	0	2	5	6	15
Total	1	9	6	5	2	8	7	38
By Share of Manufacturing, Mining, and Construction (M)								
I & II	0	1	0	8	3	1	0	13
III & IV	0	4	4	1	1	0	0	10
V, VI, & VII	2	7	4	2	0	0	0	15
Total	2	12	8	11	4	1	0	38
By Share of Services (S)								
I & II	0	0	0	4	8	1	0	13
III & IV	0	1	1	4	4	0	0	10
V, VI, & VII	0	5	6	2	2	0	0	15
Total	0	6	7	10	14	1	0	38

Derived from Appendix Table 3.

a somewhat larger number of countries, ranging from 57 to 59. But it would appear from comparison of the two tables that the distributions by shares in labor force are more dispersed than those by shares in national product, despite the smaller number of countries in the former. Thus in Table 1, in only 3 countries is the share of the A-sector in national product less than 10 percent and in only 13 is it above 50 percent, the countries at both extremes accounting for 16 out of 59. In Table 8, Variant A (including unpaid family labor), in 20 out of the 47 countries the share of the A-sector in the labor force is either below 10 or above 50 percent; and even when we exclude unpaid family labor (Variant B), in 16 countries out of 38 the share of the A-sector in the labor force is either below 10 or above 50 percent. Comparisons of the distributions by the shares of the M- and the S-sectors yield the same impression--particularly for the S-sector.

But these impressions, based upon rather crude frequency classifications, may be misleading, and it is well to check them by the calculation of the medians and dispersion values (Table 9). In general, the distributions by the share of the labor force including unpaid family labor show greater dispersion, absolute or relative, than the distributions by the share of the labor force excluding unpaid family labor. Since family labor is proportionately greater in agriculture than in other sectors, its inclusion tends to raise substantially the already large share of the A-sector in the labor force of the underdeveloped countries and to depress the already low shares of the other sectors. It thus tends to extend the lower and the upper ranges of the shares.

Table 9 Medians and Quartiles in the Distribution of Countries by Shares of Major Sectors in Labor Force, Recent Years (excluding Communist Countries)

Partition Lines (arith. means of 3 or 4 items)	Distributions Based Upon Share of					
	A	M	S	A	M	S
	Including Unpaid Family Labor (1)	(2)	(3)	Excluding Unpaid Family Labor (4)	(5)	(6)
1 Median	47.6	22.6	29.7	34.6	27.3	36.8
2 Lowest	9.8	4.8	8.2	10.9	8.8	15.4
3 First quartile	24.5	13.1	19.8	18.6	15.9	24.8
4 Third quartile	65.9	33.0	40.2	57.7	35.4	43.2
5 Highest	85.3	48.0	53.2	75.5	49.8	51.0
6 Interquartile range (4-3)	41.4	19.9	20.4	39.1	19.5	18.4
7 Ratio of 6 to 1	0.87	0.88	0.69	1.13	0.71	0.50
8 Full range (5-2)	75.5	43.2	45.0	64.6	41.0	35.6
9 Ratio of 8 to 1	1.59	1.91	1.52	1.87	1.50	0.97

Derived from Appendix Table 3.

Bearing this in mind, and considering that the relevant comparison with the distributions by shares in national product would be provided by distributions by shares in the labor force reduced to some type of full-time equivalent units, one can safely draw only the following two conclusions:

(1) No significant difference in extent of dispersion can be established between the distributions by shares of either the A- or the M-sector in the labor force, and the parallel distributions by shares in national product. However, the distributions by shares of the S-sector in the labor force, including or excluding unpaid family labor, are more widely dispersed than the distribution by share in national product. The ratio of the interquartile range to the median is 0.69 or 0.50 in the former compared with 0.34 in the latter.

(2) This wider dispersion in the distribution of countries by share of the S-sector in the labor force is still narrower than the dispersion in the distribution by the shares of the A- and the M-sectors in the labor force (compare Column 3 with Columns 1 and 2; or Column 6 with Columns 4 and 5). In other words, even in the distribution of the labor force, international differences in the share of the S-sector are definitely more limited than international differences in the shares of the A- and the M-sectors.

We now turn to the association between levels of per capita product and the industrial structure of the labor force, basing our observations first upon Table 8.

(3) The distributions by the share of the A-sector, in both variants of the labor force, drift to the right: the lower the product per capita, the larger the share of the A-sector in the labor force (top panel). And, as expected, the distributions by the share of the M-sector drift to the left: the lower the product per capita, the smaller the share of the M-sector (middle panel).

It is the distribution by the share of the S-sector that is of most interest. And in this distribution, unlike the distribution by the share of the S-sector in national product, there is a distinct drift to the left: the lower national product per capita, the lower the share of the S-sector in total labor force, including or excluding unpaid family labor (bottom panel).

Once again we test the association by computing the average shares of the industrial sectors in the labor forces, for each economic level class (Table 10). The movement of these average shares confirms the finding based on shifts of the distributions in Table 8. There is clearly negative association between international differences in product per capita and the share of the A-sector in the labor force: the larger the former, the smaller the latter, and vice versa. There is distinct positive correlation between international differences in product per capita and in the share of the M-sector: the larger the former, the larger the latter, and vice versa. Most interesting, there is distinct positive association between international differences in product per capita and the share of the S-sector in the labor force: the larger the former, the larger the latter. The decline in the share of the S-sector in the labor force with the decline in per capita product is quite consistent when we deal with labor force including unpaid family labor; but it is also pronounced for labor force excluding unpaid family labor.

However, the narrower range of international differences in the share of the S- than in those of the A- and the M-sectors in the labor force is of some effect in Table 10. Between Classes I and VII, i.e., the extremes of product per capita, the share of the A-sector in the labor force including (excluding) unpaid family labor rises from 15 (14) to 80 (61) percent--to more than 5 (4) times the low level; that of the M-sector drops from 40 (40) to 7 (15) percent--to less than a fifth (two-fifths); but the share of the S-sector drops only from 45 (45) to 14 (24)--to less than a third (a half). Likewise, in the movement from the combined Classes I and II to the combined Classes V, VI, and VII, the share of the A-sector rises from 22 (19) to 67 (56) percent--to about 3 (3) times the low level; the share of the M-sector declines from 36 (38) percent to 13 (18) percent--to about a third (less

than a half); but the share of the S-sector declines from 42 (44) percent to only 20 (26) percent--about a half (three-fifths) of the top level. The share of the S-sector is, therefore, much less sensitive to differences in per capita product than the shares of the A- and M-sectors.

For a more detailed analysis of the share in the labor force of the S-sector we distinguished the subdivisions established for the shares of national product (Table 11). Little relating to the magnitudes of dispersion can be observed from the frequency distributions. In the distribution by the share of transportation plus trade, 31 out of the 46 (or 26 out of the 38) countries fall within a relatively narrow range--from 5 to 20 percent; and the same is true of 30 out of 46 (or 22 out of 38) countries distributed by the share in labor force of the other service subdivision. But the picture of relative dispersion in the distributions becomes clear when we calculate the medians and other measures (Table 12).

A comparison of these measures with those relating to the distributions by shares of national product (Table 5) and to the distributions by shares of the three major sectors in labor force (Table 9) yields the following two conclusions.

Table 10 Arithmetic Means of Shares of Major Sectors in Labor Force, by Groups of Countries Classified by Per Capita Economic Levels, Recent Years

Economic Level Classes	No. of Countries (1)	Average Share of		
		A	M	S
		(2)	(3)	(4)
A Including Unpaid Family Labor				
I	8	15.0	40.2	44.8
II	7(8)	31.1(34.4)	31.0(29.2)	37.9(36.3)
I & II	15(16)	22.5(24.7)	35.9(34.7)	41.6(40.6)
III	6(8)	29.4(34.8)	28.3(28.0)	42.4(37.2)
IV	8(9)	58.8(57.6)	17.5(18.3)	23.7(24.1)
III & IV	14(17)	46.2(46.9)	22.1(22.9)	31.7(30.3)
V	5(7)	54.5(59.9)	18.9(16.8)	26.6(23.3)
VI	7	64.8	15.0	20.2
VII	6	79.9	6.6	13.5
V, VI, & VII	18(20)	67.0(67.6)	13.3(13.1)	19.7(19.3)
B Excluding Unpaid Family Labor				
I	7	14.4	40.3	45.3
II	6	23.4	34.8	41.7
I & II	13	18.6	37.8	43.6
III	5(7)	27.9(30.6)	30.3(32.0)	41.8(37.4)
IV	5(6)	51.1(49.3)	20.7(22.0)	28.2(28.7)
III & IV	10(13)	39.5(39.2)	25.5(27.3)	35.0(33.4)
V	4(6)	49.7(51.3)	22.0(21.4)	28.3(27.3)
VI	7	57.5	16.4	26.1
VII	4	61.2	15.1	23.7
V, VI, & VII	15(17)	56.4(56.2)	17.6(17.9)	26.1(26.0)

Derived from Appendix Table 3.

Figures in parentheses include Communist countries.

Table 11 Distribution of Countries by Shares of Service Industries in Labor Force, Recent Years (excluding Communist Countries)

A Including Unpaid Family Labor

Economic Level Classes	Percentage Share Classes						Total
	Less than 5	5-9	10-14	15-19	20-24	25 & over	
By Share of Transportation and Public Utilities (T)							
I & II	2	11	2	0	0	0	15
III & IV	8	6	0	0	0	0	14
V, VI, & VII	15	2	0	0	0	0	17
Total	25	19	2	0	0	0	46
By Share of Trade (C)							
I & II	0	2	9	4	0	0	15
III & IV	2	6	6	0	0	0	14
V, VI, & VII	7	10	1	0	0	0	18
Total	9	18	16	4	0	0	47
By Share of Other Services (OS)							
I & II	0	0	1	5	5	4	15
III & IV	0	2	2	4	3	3	14
V, VI, & VII	1	7	4	5	0	0	17
Total	1	9	7	14	8	7	46
By Share of Transportation and Trade (T+C)							
I & II	0	0	2	3	7	3	15
III & IV	2	1	5	6	0	0	14
V, VI, & VII	3	10	3	1	0	0	17
Total	5	11	10	10	7	3	46

B Excluding Unpaid Family Labor

By Share of Transportation and Public Utilities (T)							
I & II	2	9	2	0	0	0	13
III & IV	4	6	0	0	0	0	10
V, VI, & VII	12	3	0	0	0	0	15
Total	18	18	2	0	0	0	38
By Share of Trade (C)							
I & II	0	2	7	4	0	0	13
III & IV	0	4	6	0	0	0	10
V, VI, & VII	2	12	1	0	0	0	15
Total	2	18	14	4	0	0	38
By Share of Transportation and Trade (T+C)							
I & II	0	0	1	3	6	3	13
III & IV	0	1	3	5	1	0	10
V, VI, & VII	1	8	5	0	1	0	15
Total	1	9	9	8	8	3	38
By Share of Other Services (OS)							
I & II	0	0	0	4	5	4	13
III & IV	0	0	1	5	2	2	10
V, VI, & VII	0	3	4	5	1	2	15
Total	0	3	5	14	8	8	38

Derived from Appendix Table 3.

Table 12 Medians and Quartiles in the Distribution of Countries by Shares of Service Industries in Labor Force, Recent Years (excluding Communist Countries)

Partition Lines (arith. means of 3 or 4 items)	Distributions Based Upon Share of			
	T (1)	C (2)	T+C (3)	OS (4)
A Including Unpaid Family Labor				
1 Median	4.5	8.3	12.8	16.3
2 Lowest	0.7	1.0	2.1	4.9
3 First quartile	2.0	5.1	7.4	10.8
4 Third quartile	7.0	11.8	19.6	21.7
5 Highest	10.6	17.1	26.6	31.9
6 Interquartile range (4-3)	5.0	6.7	12.2	10.9
7 Ratio of 6 to 1	1.11	0.81	0.95	0.67
8 Full range (5-2)	9.9	16.1	24.5	27.0
9 Ratio of 8 to 1	2.20	1.94	1.91	1.66
B Excluding Unpaid Family Labor				
10 Median	5.4	9.7	14.7	19.0
11 Lowest	1.3	3.8	5.5	9.3
12 First quartile	2.5	6.0	8.6	15.1
13 Third quartile	7.7	13.4	21.2	24.2
14 Highest	10.8	17.2	27.0	30.5
15 Interquartile range (13-12)	5.2	7.4	12.6	9.1
16 Ratio of 15 to 10	0.96	0.76	0.86	0.48
17 Full range (14-11)	9.5	13.4	21.5	21.2
18 Ratio of 17 to 10	1.76	1.38	1.46	1.12

Derived from Appendix Table 3.

(4) The dispersion in the distributions of countries by the shares of the various subdivisions of the S-sector in the labor force is distinctly wider than that in the distribution of countries by the shares of the same subdivisions of the S-sector in national product. This is true of all the eight comparisons (for the four subdivisions) for the interquartile ranges, expressed as ratios of the medians; and of five of the eight comparisons for the full ranges, similarly expressed. In other words, the conclusion derived above as to the wider range of dispersion in the distribution of countries by the share of the total S-sector in labor force than in the distribution by the share in national product, holds also for the subdivisions within the S-sector.

(5) Compared with the distribution of countries by the share of the A- and M-sector in the labor force (including or excluding unpaid family labor, see Table 9), the distribution of countries by the share of the other service subdivision (Table 12, Column 4) shows a narrower range of relative dispersion--particularly when measured by the ratios of interquartiles ranges to the medians. This is also true

of the distribution by the share of transportation and trade combined in labor force excluding unpaid family labor. But by and large, the narrower range of international differences in the share of the S-sector in the labor force than of those in the shares of the A- and M-sectors, is due largely to the limited range in the share in the labor force of the rather heterogeneous group of other services. This confirms the point made above that one factor in the concentration, i. e., the narrow range of international differences in the share of the S-sector, lies in the greater heterogeneity of that sector than of the two others.

We may turn now to the distributions in Table 11 for the separate economic level classes.

(6) All panels of Table 11 show distributions with a drift to the left. In each subdivision of the S-sector there tends to be a positive association between product per capita and the share in total labor force: the lower the product per capita, the smaller the share.

This finding is confirmed by the arithmetic means of shares calculated separately for each economic level class, and for combinations of the latter (Table 13). The shares in the labor force of the several subdivisions of the S-sector decline quite consistently as product per capita drops. The results are only slightly modified by the inclusion of the few Communist countries.

However, here also the limited range of international differences in the share of other services in total labor is reflected in the relatively smaller decline in the share that accompanies the decline in level of product per capita. Thus, for labor force including (excluding) unpaid family labor, the share of the transportation and communication subdivision drops from 7.7 (8.1) percent for Classes I and II to 2.6 (3.4) for Classes V, VI, and VII, a drop to 0.3 (0.4) of the initial level; that of trade declines from 13.1 (13.4) to 5.6 (6.5), to 0.4 (0.5) of the initial level; that of transportation plus trade from 20.7 (21.5) to 8.1 (9.9), to less than 0.4 (0.5) of the initial level; but that of other services declines from 20.9 (22.2) to only 10.7 (16.1), to 0.5 (0.7) of the initial level.

B. Long-term trends

Before considering the direct evidence on long-term trends in the industrial structure of the labor force that accompany economic growth, we restate the expectations derived from the analysis of international differences. We expect the share of the A-sector to decline; the shares of the M- and the S-sectors to rise; the relative rise in the share of the S-sector to be more moderate than the relative rise in the share of the M-sector or the relative decline in the share of the A-sector; and within the S-sector, the relative rise in the share of other services to be more moderate than that in the shares of the other subdivisions.

For the analysis of long-term trends we used the shares in labor force including unpaid family labor, since summary data were more easily available in this form. On this basis, the secular decline in the share of the A-sector and the secular rises in the shares of the other sectors are somewhat exaggerated. However, analysis of the labor force excluding women in agriculture (data available in Colin Clark's publications) yields similar findings. The entries in Table 14 distinguish long intervals, 30 to 40 years; and relate to single years because the underlying data are usually taken from population censuses. But these estimates of the labor force, unlike those of employment, are not sensitive to short-term fluctuations.

Table 13 Arithmetic Means of Shares of Service Industries in Labor Force, by Groups of Countries Classified by Per Capita Economic Level, Recent Years

Economic Level Classes	No. of Coun- tries (1)	Average Share of			
		T	C	T C	OS
		(2)	(3)	(4)	(5)
A Including Unpaid Family Labor					
I	8	8.4	14.9	23.3	21.6
II	7(8)	6.8(6.6)	11.0(10.2)	17.8(16.8)	20.2(19.6)
I & II	15(16)	7.7(7.5)	13.1(12.5)	20.7(20.1)	20.9(20.6)
III	6(8)	6.0(5.4)	10.9(9.7)	16.9(15.0)	25.5(22.2)
IV	8(9)	3.3(3.3)	6.1(6.0)	9.4(9.4)	14.2(14.7)
III & IV	14(17)	4.5(4.3)	8.2(7.8)	12.6(12.0)	19.1(18.2)
V	4(6)-5(7)	3.2(2.7)	7.4(6.0)	10.4(8.4)	13.7(12.6)
VI	7	2.5	5.2	7.7	12.5
VII	6	2.3	4.6	6.9	6.5
V, VI, & VII	17(19)- 18(20)	2.6(2.5)	5.6(5.3)	8.1(7.7)	10.7(10.7)
B Excluding Unpaid Family Labor					
I	7	8.6	15.1	23.7	21.7
II	6	7.6	11.4	18.9	22.8
I & II	13	8.1	13.4	21.5	22.2
III	5(7)	6.4(5.9)	11.5(10.3)	17.8(16.3)	24.0(21.1)
IV	5(6)	4.0(3.9)	8.0(7.8)	12.0(11.7)	16.2(17.1)
III & IV	10(13)	5.2(5.0)	9.7(9.1)	14.9(14.1)	20.1(19.3)
V	4(6)	4.0(3.6)	8.2(7.0)	12.1(10.7)	16.2(16.7)
VI	7	3.5	6.1	9.6	16.6
VII	4	2.6	5.8	8.3	15.3
V, VI, & VII	15(17)	3.4(3.3)	6.5(6.3)	9.9(9.7)	16.1(16.3)

Derived from Appendix Table 3.

Figures in parentheses include Communist countries.

The entries in Column 1 indicate the smallest and largest number of countries represented in the average shares.

(7) In every country, except Yugoslavia and India, and in every interval distinguished, the share of the A-sector in the labor force declines. The declines are quite substantial, although they naturally vary with the duration of the period covered by the data. In some countries like Great Britain and the United States, the total decline is almost eight tenths of the initial level of the share.

(8) In most countries, the share of the M-sector in the labor force rises. But there are several exceptions. In Ireland-Eire, Yugoslavia, India, Mexico, and New Zealand it declines; but in the first, the decline may be due to a change in territory. Furthermore, in many countries in which the share of the M-sector

Table 14 Long-Term Changes in Shares of Industrial Sectors in Labor Force, Twenty-eight Countries

	A	M	S	T+C	OS
	(1)	(2)	(3)	(4)	(5)
<u>Austria</u> ^a					
1 1869	48	28	24	7	17
2 1910	41	35	24	13	12
3 Change (2-1)	-7	+7	0	+6	-5
<u>Belgium</u> ^a					
4 1880	25	39	36	10	27
5 1947	11	50	39	21	19
6 Change (5-4)	-14	+11	+3	+11	-8
<u>Denmark</u>					
7 1870-79	51.2	48.8			
8 1905-14	40.0	60.0			
9 1947-52	23.1	76.9			
10 Change, 1870-79 to 1905-14 (8-7)	-11.2	+11.2			
11 Change, 1905-14 to 1947-52 (9-8)	-16.9	+16.9			
<u>Finland</u> ^a					
12 1880	79	9	12	4	8
13 1910	70	17	13	7	6
14 1940	47	28	25	12	13
15 Change, 1880-1910(13-12)	-9	+8	+1	+3	-2
16 Change, 1910-1940(14-13)	-23	+11	+12	+5	+7
<u>France</u>					
17 1866	52	29	20		
18 1906	43	32	25		
19 1950 ^b	33	34	33		
20 Change, 1866-1906(18-17)	-9	+3	+5		
21 Change, 1906-1950(19-18)	-10	+2	+8		
<u>Germany (Versailles Territory)</u>					
22 1882	42	36	22	8	14
23 1933	29	41	30	18	12
24 Change (23-22)	-13	+5	+8	+10	-2
<u>Ireland</u>					
25 1841	51	34	15	3	11
26 1901	44	28	28	9	19
27 1951	31	27	42	19	23
28 Change, 1841-1901(26-25)	-7	-6	+13	+6	+8
29 Change, 1901-1951(27-26)	-13	-1	+14	+10	+4
<u>Netherlands</u>					
30 1909	28	35	37	19	17
31 1947	19	33	48	20	27
32 Change (31-30)	-9	-2	+11	+1	+10

	(1)	(2)	(3)	(4)	(5)
<u>Norway</u>					
33 1875	59	19	22	11	10
34 1910	47	25	28	17	12
35 1950	29	35	36	23	12
36 Change, 1875-1910(34-33)	-12	+6	+6	+6	+2
37 Change, 1910-1950(35-34)	-18	+10	+8	+6	0
<u>Sweden</u>					
38 1910	46	26	28	11	17
39 1950	20	41	39	21	18
40 Change (39-38)	-26	+15	+11	+10	+1
<u>England & Wales - United Kingdom</u>					
41 1841	23	45	32	8	24
42 1911	8	46	46	21	24
43 1911	12	43	45		
44 1951	5	47	48		
45 Change, 1841-1911(42-41)	-15	+1	+14	+13	0
46 Change, 1911-1951(44-43)	-7	+4	+3		
<u>Switzerland^a</u>					
47 1888	33	45	22	8	14
48 1941	20	46	34	15	19
49 Change (48-47)	-13	+1	+12	+7	+5
<u>Italy</u>					
50 1871	62	24	14	5	9
51 1901	59	24	16	8	8
52 1954	41	31	28	16	13
53 Change, 1871-1901(51-50)	-3	0	+2	+3	-1
54 Change, 1901-1954(52-51)	-18	7	+12	+8	+5
<u>Portugal^a</u>					
55 1890	65	19	16	6	10
56 1930	56	21	23	9	14
57 Change (56-55)	-9	+2	+7	+3	+4
<u>Spain</u>					
58 1900	67	14	19	4	15
59 1941	49	25	27	11	16
60 Change (59-58)	-18	+11	+8	+7	+1
<u>Hungary</u>					
61 1900	59	17	24	6	18
62 1941	50	23	27	9	18
63 Change (62-61)	-9	+6	+3	+3	0
<u>Yugoslavia^a</u>					
64 1895	60	17	23	12	11
65 1931	72	16	12	6	7
66 Change (65-64)	+12	-1	-11	-6	-4

	(1)	(2)	(3)	(4)	(5)
<u>India^a</u>					
67 1881	51	32	17	5	12
68 1931	64	14	22	9	14
69 Change (68-67)	+13	-18	+5	+4	+2
<u>Japan</u>					
70 1877 & 1882	83	6	11		
71 1907 & 1912	63	18	19		
72 1950	48	21	30		
73 Change, 1877 & 1882 to 1907 & 1912 (71-70)	-20	+12	+8		
74 Change, 1907 & 1912 to 1950 (72-71)	-15	+3	+11		
<u>Union of South Africa</u>					
75 1911	59	16	25	3	22
76 1946	47	20	33	9	24
77 Change (76-75)	-12	+4	+8	+6	+2
<u>Canada</u>					
78 1871	50	13	37		
79 1911	37	29	33		
80 1950-53	21	35	44		
81 Change, 1871-1911(79-78)	-13	+16	-4		
82 Change, 1911-1950-53 (80-79)	-16	+6	+11		
<u>United States</u>					
83 1870	50	25	25	10	15
84 1910	31	31	38	16	22
85 1950	12	35	53	27	26
86 Change, 1870-1910(84-83)	-19	+6	+13	+6	+7
87 Change, 1910-1950(85-84)	-19	+4	+15	+11	+4
<u>Brazil</u>					
88 1872	78	22			
89 1920	69	31			
90 1950	58	42			
91 Change, 1872-1920 (89-88)	-9	+9			
92 Change, 1920-1950 (90-89)	-11	+11			
<u>Cuba</u>					
93 1899	48	15	37	13	24
94 1943	41	15	44		
95 Change (94-93)	-7	0	+7		
<u>Mexico</u>					
96 1900	70	20	10	6	.4
97 1950	58	16	26	11	16
98 Change (97-96)	-12	-4	+16	+5	+12
<u>Puerto Rico</u>					
99 1899	63	7	30	7	23
100 1948	39	24	37	17	21
101 Change (100-99)	-24	+17	+7	+10	-2

	(1)	(2)	(3)	(4)	(5)
<u>Australia</u>					
102 1871	37	33	30	11	19
103 1901	25	34	41	20	20
104 1933	22	35	43	25	18
105 Change, 1871-1901 (103-102)	-12	+1	+11	+9	+1
106 Change, 1901-1933 (104-103)	-3	+1	+2	+5	-2
<u>New Zealand</u>					
107 1874	31	41	28	12	17
108 1901	30	33	37	20	17
109 1936	25	29	46	26	20
110 Change, 1874-1901 (108-107)	-1	-8	+9	+8	0
111 Change, 1901-1936 (109-108)	-5	-4	+9	+6	+3

Derived from Appendix Table 4 and includes unpaid family labor unless otherwise stated.

a. Excludes women in agriculture.

b. Average of two estimates.

risers, the proportional increase is quite moderate: France, Great Britain, Germany, Australia, and Italy (in the latter one of the two intervals shows no change, but the balance over the period as a whole is positive). By and large, the rise in the share of the M-sector in the labor force is neither as consistent, nor as sizable, as expected from the cross-section analysis. And yet in most of the countries that are exceptions, per capita real income has grown substantially over the period covered by the data.

In general, declines or small proportional rises in the share of the M-sector are observed in countries with large initial shares: in Great Britain, Ireland, Germany, Switzerland, Australia, and New Zealand, the initial levels range from 33 to 45 percent. In most countries in which the share of the M-sector rises substantially the initial levels are much lower: ranging from less than 10 percent (in Finland, Japan, and Puerto Rico), to less than 30 percent, the only exceptions being Belgium with an initial level of 39 percent. This may serve to explain why we do not find as consistent and marked a rise in the share of the M-sector in Table 14 as would be expected from the analysis of international differences. In the sample of countries studied in the latter, countries with high levels of product per worker are characterized by relatively high shares for the M-sector, regardless of whether these high levels were attained recently or had been established earlier and represent slight declines from formerly high levels; and likewise, countries with low levels of product per worker are characterized by relatively low shares for the M-sector, regardless of whether these represent a substantial rise from still lower earlier levels. But in observing the trends directly, we find that the share of the M-sector does not rise substantially beyond a certain level, despite further rises in product per capita. There is thus an upper limit imposed upon the share of the M-sector, possibly because rapidly rising productivity per worker makes it unnecessary to divert into the M-sector an increasing share of the labor force.

(9) With the exception of the Austrian Empire, Canada (in one interval) and Yugoslavia, the share of the S-sector in the labor force rises. Furthermore, in most countries the relative rise is quite substantial, and definitely greater than the rise in the share of the M-sector.

In fact, in most countries the substantial decline in the share of the A-sector is compensated by a substantial rise in the share of the S-sector--not by a rise in the share of the M-sector. In this sense, the long-term trends in the industrial distribution of the labor force contrast with the trends in industrial structure of national product--in which it was the rise in the share of the M-sector that largely compensated for the decline in the share of the A-sector; and they are also different from the trends that we would expect from cross-section analysis.

These two contrasts suggest two implications. The first relates to differential trends in product per worker, as between the M- and the S-sectors. If product per worker in the latter rises less or declines more than product per worker in the former, the share of the S-sector in national product will rise much less consistently than its share in the labor force--while the opposite would be true of the share of the M-sector. In the following section we shall study these trends in product per worker.

The second implication suggests that the movements in the share of the S-sector in the labor force, accompanying industrialization and growth of income per capita, are not in the same direction in the different phases of the process of long-term growth. It may well be that in the earlier phases the share of the S-sector in the labor force declines, or is stable--the loss in the share of the A-sector being largely compensated by the gain in the share of the M-sector. But beyond a certain point the share of the S-sector begins to rise--a point set by increasing productivity in the M-sector and by shifts in the structure of wants of consumers, once a certain level of per capita real income has been reached. Table 14 shows so many cases of substantial rise in the S-sector in the labor force because so many countries in the sample are in the second phase suggested above. Yet this implication is highly speculative and no strong support is found for it when we observe the rise in the share of the S-sector in the labor force of countries like Mexico, Cuba, and India.

(10) Within the S-sector, two major subdivisions are distinguished--transportation plus trade, and other services. The share in the labor force of transportation plus trade rises consistently, in every country except Yugoslavia, and in every interval for which data are available. Furthermore, the rises are quite substantial, measured as proportions of the initial levels. By contrast, the rise in the share of the other services subdivision is less consistently observed; in Great Britain and Hungary there is no net rise, and there is a decline in Sweden, in one interval for Finland, in Belgium, in the Austrian Empire, in Germany, in one interval for Italy, in Yugoslavia, Puerto Rico, and in one interval for Australia. Furthermore, in several other countries, the proportional rise in the share of other services is more moderate than the rise in the share of the transport plus trade subdivision. In respect of this less consistent and more moderate rise in the share of the other services subdivision, the direct evidence on long-term trends supports the findings derived from the analysis of international differences.

IV. Inter-Sectoral Differences in Product Per Worker

Since the data on the industrial distribution of total product and of the labor force are available for comparable major sectors, product per member of labor

force (worker) for these sectors can be derived. Were the distributions of total product and labor force identical, product per worker would be the same for all sectors. But the two distributions have been shown to differ in significant respects, both in international comparisons and in long-term trends. We, therefore, observe directly the inter-sectoral differences in product per worker.

Before we present the evidence, a few comments on the meaning of the measures may be appropriate. If product originating in a given sector is divided by the number of workers attached to it, the ratio presumably does not measure productivity of labor, even if in current prices and per man--instead of some adjusted value basis and per man-hour. For the product of a given sector is the yield not only of labor directly applied to it, but also of capital and other factors of production. Yet, if labor force includes not only employees of various levels, from the unskilled to the most skilled and managerially responsible, but also all entrepreneurs--as is the customary practice--and if incomes received by the labor force constitute its product, as distinct from pure property income (rents, interest, dividends) which is the product of capital, we do find, for the countries for which the data are available, that service incomes (i.e., wages, salaries, and entrepreneurial income) account for the bulk of total product--ranging from 75 to 90 percent; and property incomes account for only 10 to 25 percent. Furthermore, there is a component of property incomes within all sectors of the industrial distribution, at least those that we are using in the present analysis, i.e., A, M, and S and the two major subdivisions of S (transport and commerce, and other services). If we find that product per worker in one sector is twice that in another, the presumption is quite strong that productivity of labor and management, as evaluated by society in current prices, is appreciably greater in the former than in the latter--for it is most unlikely that the differential weight of the property income component is large enough to offset or even greatly reduce the disparity.

Likewise, total product originating in a given sector closely approximates incomes distributed to the factors of production engaged in it, i.e., to the men and women in the labor force attached to it, and owners of capital invested in it. The only difference is undistributed corporate profits (or in the case of government, net gains or losses), which is usually, and particularly in the long run, only a minor fraction of the total product originating in any major sector. The service part of distributed incomes naturally flows to the members of the labor force; the property incomes may flow to members of the labor force, some of whom may be attached to one sector and others may be attached to other sectors; or they may flow to recipients who are not members of the labor force. The proportion of property income that flows to non-members of the labor force is ordinarily quite limited; and so is the proportion of all property incomes in the total income paid out, or in total product. It follows that differences in product per worker among major industrial sectors are a rough approximation to differences in service income per member of the labor force.

At any rate, given the present limited supply of information, we are compelled to use the data on the industrial distribution of total product and of the labor force as they stand; and study inter-sectoral differences in total product per worker. Whatever conclusions these suggest will be only rough leads to what we might find were the more detailed data available; but they may prove valuable nevertheless.

A. International differences for recent years.

(1) Differences between product in A and non-A sectors--If for a given country, the share of the A-sector in total product is, say, 30 percent, and its share in the labor force is, say, 40 percent, product per worker

in the A-sector equals 0.75 of the countrywide product per worker (i.e., 30/40). If in the same country the share of the M-sector in total product is 36 percent, and its share in the labor force is 30 percent, per worker product in the M-sector is 1.2 times the countrywide product per worker. It also follows that product per worker in the M-sector is $1.2/0.75$, or 1.6, times product per worker in the A-sector. It is in this form, i.e., of ratios of product per worker in the several sectors to the countrywide product per worker, that we shall observe and analyze inter-sectoral differences (Table 15).

Table 15 Medians and Quartiles of Product per Worker in the Agricultural and Non-Agricultural Sectors, Expressed as Relatives of National Product per Worker, Recent Years (excluding Communist Countries)

	A (1)	M S (2)	A/(M S) (3)
A Labor Force Including Unpaid Family Labor			
1 Relatives of medians in Tables 2 and 9	0.71	1.26	0.56
<u>Relatives derived directly, sample of 40 countries</u>			
2 Median (arith. mean of 4 items)	0.62	1.28	0.46
3 Lowest (arith. mean of 3 items)	0.34	0.96	0.14
4 First quartile (arith. mean of 3 items)	0.55	1.09	0.34
5 Third quartile (" " " " ")	0.81	1.69	0.65
6 Highest (" " " " ")	1.22	3.69	1.30
7 Number of countries with relatives below			
1.0	37	1	37
B Labor Force Excluding Unpaid Family Labor			
8 Relatives of medians in Tables 2 and 9	0.98	1.01	0.97
<u>Relatives derived directly, sample of 33 countries</u>			
9 Median (arith. mean of 3 items)	0.78	1.09	0.71
10 Lowest (arith. means of 3 items)	0.49	0.89	0.32
11 First quartile (arith. means of 3 items)	0.65	1.02	0.45
12 Third quartile (" " " " ")	0.92	1.45	0.89
13 Highest (" " " " ")	1.39	1.74	1.57
14 Number of countries with relatives below			
1.0	29	4	29

Derived from Appendix Table 5 unless otherwise indicated.

The comparison of the percentage shares of the sectors in total product with the shares of the corresponding sectors in labor force can be based on the distributions established for the different samples of countries used in Sections II and III. For example, we compare the median share of the A-sector in total product found in the distribution of 59 countries in Section II (see Table 2) with the median

share of the A-sector in labor force, including unpaid family labor, in the distribution of 47 countries or with the median share in labor force, excluding unpaid family labor, in the distribution of 38 countries in Section III (see Table 9). Such a comparison assumes that the median shares of the A-sector in total product and in labor force, established for the two or three distributions with different numbers and identities of countries, are rough approximations to the representative shares of the A-sector in the comparable universe of countries. It is in this way that the entries in lines 1 and 8 of Table 15 were derived. The results show that product per member of labor force in the A-sector is below the countrywide level of product per worker, roughly 0.7 for labor force including unpaid family labor. However, when we deal with labor force excluding unpaid family labor, the two distributions differ substantially in the number of countries included (59 and 38), and the resulting ratios of medians (line 8) which yield a product per worker in the A-sector close to the countrywide level, cannot be assigned much significance.

The alternative procedure is far more reliable. We compare the shares of the A-sector in total product and in the labor force for each country for which data for both are available; calculate for each country product per worker in the A-sector as the ratio to countrywide product per worker; array the ratios; and establish the median value. This was possible for 40 countries with labor force including unpaid family labor, and for 33 countries with labor force excluding unpaid family labor. The resulting medians are entered in lines 2 and 9 of Table 15, and should be given greater weight than the entries in lines 1 and 8. In both variants A and B, product per worker in the A-sector is lower than the countrywide--the shortfall being greater when labor force includes unpaid family labor than when it excludes the latter; and in both the product per worker in the A-sector is much lower than product per worker in the M- and S-sectors combined, from below a half to about two-thirds of the latter.

For the sample of countries for which sectoral product per worker was calculated for each country separately, we established other partition values in addition to the median. This permitted us to observe the range in the distribution of countries by relative product per worker in the A- and the M+S sectors (Table 15, lines 3-6 and 10-13). The range in the distribution is fairly wide; in some countries the ratio of product per worker in the A-sector is close to the countrywide or even above it, and in some countries product per worker in the M+S sector is below the countrywide level of product per worker. But by and large, the relatively low level of product per worker in the A-sector and much higher level of product per worker in the M+S sector are quite prevalent. Of the forty countries with labor force including unpaid family labor only 3 show product per worker in the A-sector equal to or larger than either countrywide product per worker, or product per worker in the M+S sector; of the 33 countries for which labor force excludes family labor, only 4 show product per worker in the A-sector equal to or larger than countrywide product per worker or product per worker in the M+S sector.

Given the substantial international differences in relative product per worker in the A- and the M+S sectors, the interesting question here is whether there is any association between these differences and international differences in income per capita. An answer to this question is provided by classifying the countries by level of income per capita, and observing the movements of relative product per worker in the A- and M+S sectors by economic level classes (Table 16).

The comparisons summarized in Table 16 were carried through in the same double fashion as those in Table 15. In Columns 1-3, we compare the averages of shares in total product and in the labor force calculated for the different samples of countries in Sections II and III (Tables 3 and 10)--separately for the economic

Table 16 Arithmetic Means of Agricultural and Non-Agricultural Sector Relatives of National Product per Worker, by Groups of Countries Classified by Per Capita Economic Level, Recent Years (excluding Communist Countries)

Economic Level Classes	Derived from Tables 3 and 10			Derived Directly from Sample of Identical Countries			
	A	M+S	A/(M+S)	No. of Countries	A	M+S	A/(M+S)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A Labor Force Including Unpaid Family Labor							
I	0.88	1.02	0.86	7	0.86	1.03	0.86
II	0.55	1.20	0.46	6	0.60	1.19	0.52
I & II	0.67	1.10	0.61	13	0.74	1.10	0.70
III	0.65	1.14	0.57	6	0.69	1.15	0.61
IV	0.51	1.70	0.30	5	0.48	2.02	0.27
III & IV	0.55	1.39	0.40	11	0.59	1.55	0.46
V	0.65	1.42	0.46	5	0.61	1.48	0.42
VI	0.66	1.63	0.40	7	0.69	1.72	0.45
VII	0.68	2.26	0.30	4	0.67	2.74	0.31
V, VI, & VII	0.68	1.65	0.41	16	0.66	1.90	0.41
B Labor Force Excluding Unpaid Family Labor							
I	0.92	1.01	0.91	5	0.92	1.01	0.95
II	0.74	1.08	0.69	5	0.85	1.05	0.81
I & II	0.81	1.04	0.78	10	0.89	1.03	0.88
III	0.69	1.12	0.62	5	0.75	1.10	0.70
IV	0.59	1.43	0.41	3	0.59	1.44	0.45
III & IV	0.64	1.23	0.52	8	0.69	1.23	0.60
V	0.71	1.28	0.55	4	0.75	1.31	0.61
VI	0.74	1.35	0.55	7	0.79	1.33	0.65
VII	0.89	1.17	0.76	4	1.00	1.34	0.89
V, VI, & VII	0.81	1.25	0.65	15	0.84 ^a	1.32 ^a	0.70 ^a

Derived from Appendix Table 5 unless otherwise indicated.

Column 7 shows averages of ratios calculated separately for each country and not necessarily equal to ratios of averages in Columns 5 and 6.

a. Excluding the Belgian Congo the averages are 0.79, 1.36, and 0.62 respectively.

level classes, and for shares in labor force including and excluding unpaid family labor. In Columns 4-7, the samples of countries are identical for total product and labor force, and the relative product per worker was calculated separately for each country. The results of both comparisons are fairly similar, and can be summarized together.

First, if we deal with labor force including unpaid family labor, the relative level of product per worker in the A-sector declines markedly, as total product per

capita drops. In the more advanced and developed countries, particularly in Class I, product per worker in the A-sector is close to the countrywide level of product per worker. It then drops sharply, but the decline stops at about Class IV and the relative levels begin to rise somewhat. A similar movement characterizes the relatives of product per worker in the A-sector when we deal with labor force excluding unpaid family labor.

Second, the relatives of product per worker in the M+S sector rise, as total product per capita drops. When labor force includes unpaid family labor, the rise in the relative level of product per worker in the M+S sector is fairly continuous from Class I to Class VII, from about 1.0 to 2.0 or more. When labor force excludes unpaid family labor, the negative correlation between total product per capita and the relative level of product per worker in the M+S sector is still quite clear, but the rise in the latter as product per capita drops is neither so sharp nor so continuous: the rise is only from 1.0 to about 1.3.

Third, when product per worker in the A-sector is related to product per worker in the M+S sector, the decline in the relative level of the former as total product per capita declines, naturally remains. It is particularly conspicuous when we deal with labor force including unpaid family labor, moving from close to 1.0 to below 0.4. The decline is almost as great for labor force excluding unpaid family labor, but it stops at Class IV and the relative levels rise somewhat in Classes V, VI, and VII.

Two aspects of these findings are worth stressing. First, if the relative level of product per worker in the A-sector declines as total product per capita declines, and hence presumably total product per worker also declines, the contrast between the developed and the underdeveloped countries in product per worker in agriculture must be even wider than in total product per worker. In other words, international differences in product per worker in agriculture are wider than in countrywide product per worker, or still wider than in product per worker in the non-agricultural sectors combined. Given the large share of the A-sector in countries with low product per capita, one may conclude that the major source of backwardness is the extremely low productivity in the A-sector. Second, to the extent that differences in product per worker between the A- and the M+S sectors approximate differences in income per worker and per capita between the rural and the urban populations, this relative difference is more marked in countries with low than in countries with high product per capita, in the underdeveloped than in the developed countries.

The findings in Table 16, particularly those in Columns 5-7 which, being based on a sample of identical countries, yield a more reliable picture of international differences, raise three questions. (a) Why should not only the absolute, but also the relative level of product per worker in the A-sector decline as product per worker declines? (b) Why does this decline in the relative product per worker in the A-sector, observed as we move from Class I to Class IV, cease as we pass to Classes V-VII? (c) Why does the drop in the product per worker in the A-sector relative to product per worker in the M+S sector stop at Class IV, particularly when we deal with labor force excluding unpaid family labor?

(a) Two answers may be suggested. First, as product per capita (and hence per worker) declines, the share of the A-sector in the labor force increases (see Section III). This means that there is a negative association between the percentage share of the A-sector in the labor force and its relative level of product per worker. And it suggests that countries with lower product per capita and larger shares of

the A-sector in the labor force may have a large supply of labor relative to capital and other resources, indeed an oversupply in the real sense of the word, which would lead to a lower product per worker in the A-sector than in the countrywide product.

The second answer is in a way an elaboration of the first. Because of the large supply of labor in the A-sector, the absolute levels of product per worker in that sector are low. But the M- and S-sectors together account for only a limited fraction of total labor force; and what is particularly important, include groups which must, in order to perform efficiently, receive incomes above some absolute minimum; and include groups which can, because of their strategic position, derive incomes much higher than those characterizing the A-sector. To illustrate: in an underdeveloped country, the M- and S-sectors include professional and managerial groups which must maintain some minimum standards, and cannot live at the income level of peasants and still carry on their activities effectively. Yet these minimum standards, while meaning per capita incomes much lower than those of their professional and managerial counterparts in a developed country, are a larger multiple of the countrywide product per worker than in the latter. For example, in India a university professor's salary may amount to say 10,000 rupees a year (\$2,000 by the prevailing rate of exchange) and is much lower than a university professor's salary in the United States of say \$7,500 a year, although the disparity is not as great after allowing for differences in purchasing power. Yet this salary in India is, on the basis of a ratio of workers to population of say 0.4, about 14 times the countrywide income per worker, whereas the salary cited for the United States is less than double the countrywide income per worker. There are also trading and financial groups in the underdeveloped countries that, because they are few and more sophisticated economically than the rest of the population, can easily establish monopolistic positions and can secure incomes higher than the countrywide average--a much more difficult and limited possibility in the more developed countries, with their greater competition, degree of public regulation, and wider spread of economic knowledge.

(2) If these are the reasons for a decline in the relative product per worker in the A-sector as we move down the scale of countrywide income per capita, why should this decline not extend through the full range from Class I to Class VII? Why should it stop at Class IV?

A possible explanation is suggested in the mathematical appendix, which indicates, in simple algebra, the combination of effects of sectoral levels of product per worker and of weights of these sectors on the countrywide product per worker. This appendix demonstrates that as we move from country to country, or over time, the changes in relative product per worker in a sector are due partly to changes in the absolute level of per worker product, partly to changes in the countrywide averages associated merely with shifts in weights of the different sectors. In the present case, as we move to Classes V-VII, the share of the A-sector in total labor force increases markedly, which tends to lower the countrywide product per worker and hence, in and of itself, tends to raise the relative for product per worker in the A-sector. In other words, through the range from Class I to Class VII, two conflicting trends are operating: one, the decline in the absolute level of product per worker in the A-sector tends to lower the relative; the other, the rise in the share of the A-sector in total labor force, tends to raise the relative. The decline that we in fact observe in relative product per worker in the A-sector from Class I to Class IV is due to the domination of the former trend over the latter; the stability that we observe from Class IV to Class VII can be viewed as a result of the two trends offsetting each other. In other words, the absolute level of product per worker in the A-sector continues to decline below Class IV; but this decline percentagewise is no greater than the decline in the countrywide product per worker.

(c) The explanation just adduced would not, however, account for the relation between product per worker in the A- and the M+S sectors. Here the decline continues, on the whole, through the full range of economic level classes when we deal with labor force including unpaid family labor (Column 7, top panel), but it stops at Class IV, when we exclude unpaid family labor. I have no ready explanation of this latter movement. It is possible that the greater proportional importance of unpaid family labor in the A-sector, especially in the more underdeveloped countries, tends to brake any further decline in the relative product per worker in the A-sector when calculated for workers excluding this auxiliary labor supply. It may also be that at the lower ranges of income among underdeveloped countries, the greater importance of handicrafts in the M-sector and of low paid service groups in the S-sector prevents any further decline in the ratio of the A- to the M+S sectors.

(2) Product per worker in the M- and S-sectors--We can now advance the analysis a step further, and consider the relative levels of product per worker in the M- and S-sectors (Table 17).

The results of the two comparisons--one based on different samples of distributions of countries by shares in total product and the labor force separately (lines 1 and 8) and the other on a sample of identical countries, with the relative levels of product per worker calculated for each country, are somewhat different. But both indicate that the relative product per worker in the M-sector is lower than that in the S-sector. Particularly, the sample of 39 (or 32, for labor force excluding unpaid family labor) identical countries strongly suggests that product per worker in the M-sector, while close to or above the countrywide average, is lower than that for the S-sector: this is true of 23 (or 20) out of the 39 (or 32) countries.

The explanation may lie partly in the composition of the labor force in the two sectors, partly in the possibly differing importance of property incomes in the two. The M-sector is largely dominated by manufacturing, with construction being a poor second, and mining an even poorer third. In manufacturing and in construction, we may find in the less developed countries a predominance of small-scale, handicraft industry in which average income per worker, including entrepreneurs, is not likely to be high. And in large-scale undertakings, the numerical dominance of wage earners over managerial and proprietary staff, may again tend to keep down product per worker. By contrast, in at least some branches of the S-sector--professional, trade, and finance--entrepreneurs may derive relatively high incomes, and the average is not likely to be as diluted by large numbers of employees. Furthermore, in at least some branches of the service sector, the property income component of total product is likely to be quite high (particularly in finance, and to some extent in transportation and communication utilities, due to a high ratio of capital to labor).

Whatever the reason, one consequence follows. Since the share of the S-sector in labor force is usually larger than the share of the M-sector, and since product per worker in the former is usually larger than in the latter, the higher relative product per worker in M+S than in the A-sector must be largely due to the influence of the S-sector. It is the latter which, through its higher product per worker and its greater weight, raises the countrywide product per worker, and depresses the relative standing of the product per worker in the A-sector.

What about the association between differences in relative level of product per worker in the M- and S-sectors and the differences in total product per capita

Table 17 Medians and Quartiles of Product per Worker in the Manufacturing, Mining, and Construction and Services Sectors, Expressed as Relatives of National Product per Worker, Recent Years (excluding Communist Countries)

	M (1)	S (2)	M/S (3)
A Labor Force Including Unpaid Family Labor			
1 Relatives of medians in Tables 2 and 9	0.96	1.34	0.72
<u>Relatives derived directly, sample 39 countries</u>			
2 Median (arith. mean of 3 items)	1.19	1.33	0.94
3 Lowest (arith. mean of 3 items)	0.77	0.92	0.43
4 First quartile (arith. mean of 3 items)	0.98	1.08	0.66
5 Third quartile (" " " " ")	1.46	1.93	1.09
6 Highest (" " " " ")	4.59	4.20	1.78
7 Number of countries with relatives below	1.0	11	4
			23
B Labor Force Excluding Unpaid Family Labor			
8 Relatives of medians in Table 2 and 9	0.79	1.08	0.73
<u>Relatives derived directly, sample of 32 countries</u>			
9 Medians (arith. mean of 4 items)	1.05	1.17	0.92
10 Lowest (arith. mean of 3 items)	0.73	0.83	0.45
11 First quartile (arith. mean of 3 items)	0.87	0.99	0.60
12 Third quartile (" " " " ")	1.17	1.57	1.40
13 Highest (" " " " ")	1.57	2.11	1.31
14 Number of countries with relatives below	1.0	13	7
			20

Derived from Appendix Table 5 unless otherwise indicated.

or per worker? The necessary measures are summarized in Table 18. The conclusions suggested may be listed seriatim.

First, when labor force includes unpaid family labor, product per worker in the M-sector, relative to countrywide, tends to be above 1.0; and definitely rises as total product per capita declines, i.e., from Class I down to Class VII. However, when we exclude unpaid family labor, the movement in product per worker in the M-sector becomes much narrower, and there appears to be no association with differences in total product per capita. This is particularly significant since, with the rise in the share of the A-sector in total labor force as we go down the scale of economic level classes, we would expect the relative product per worker in the non-agricultural sectors to rise.

Second, the relative levels of product per worker in the S-sector are well above 1.0, i.e., higher than countrywide, whether or not unpaid family labor is

Table 18 Arithmetic Means of Manufacturing, Mining, and Construction and Service Sector Relatives of National Product per Worker, by Groups of Countries Classified by Per Capita Economic Level, Recent Years (excluding Communist Countries)

Economic Level Class	Derived from Tables 3 and 10			Derived Directly from Sample of Identical Countries			
	M	S	M/S	No. of Countries	M	S	M/S
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A Labor Force Including Unpaid Family Labor							
I	0.95	1.09	0.87	7	1.03	1.04	1.01
II	1.34	1.09	1.23	6	1.26	1.12	1.14
I & II	1.11	1.09	1.02	13	1.13	1.08	1.07
III	1.03	1.22	0.84	6	1.01	1.23	0.85
IV	1.38	1.93	0.72	5	1.64	2.37	0.82
III & IV	1.19	1.52	0.78	11	1.30	1.75	0.84
V	1.29	1.51	0.85	5	1.31	1.57	0.85
VI	1.19	1.95	0.61	7	1.23	2.10	0.61
VII	2.08	2.47	0.84	3	4.17	2.79	1.48
V, VI, & VII	1.35	1.89	0.71	15	1.84	2.06	0.86
B Labor Force Excluding Unpaid Family Labor							
I	0.95	1.08	0.88	5	1.02	1.02	1.03
II	1.19	0.99	1.20	5	1.11	0.98	1.14
I & II	1.05	1.04	1.01	10	1.06	1.00	1.09
III	0.96	1.23	0.78	5	0.95	1.19	0.84
IV	1.17	1.62	0.72	3	1.24	1.54	0.83
III & IV	1.04	1.38	0.75	8	1.06	1.32	0.84
V	1.10	1.42	0.77	4	1.18	1.39	0.87
VI	1.09	1.51	0.72	7	0.97	1.60	0.63
VII	0.91	1.41	0.65	3	1.18	1.52	0.89
V, VI, & VII	1.02	1.43	0.71	14	1.08	1.52	0.76

Derived from Appendix Table 5 unless otherwise indicated.

Column 7 shows averages of ratios calculated separately for each country and not necessarily equal to ratios of averages in Columns 5 and 6.

included. And the negative association with differences in total product per capita also persist whether unpaid family labor is included or excluded. In other words, international differences in product per worker in the S-sector are consistently related to differences in total product per capita: the higher the latter, the lower the former, and vice versa.

Third, the ratio of product per worker in the M-sector to that in the S-sector is positively correlated with total product per capita or per worker. As total product per capita or per worker declines, this ratio declines; or, in other

words, the relative excess of product per worker in the S-sector over that in the M-sector increases. (We disregard the values for Class VII because of the small number of countries in it.)

In the light of these findings, we can restate the inference drawn from Table 16. To begin with, international differences among developed and underdeveloped countries are greatest in per worker product in the A-sector, and are least in per worker product in the S-sector. Next, the disparity in income per head is greater in the less developed countries not only between the A and M+S sectors, but also between the M- and S-sectors.

(3) Product per worker in the two subdivisions of the S-sector--The final step in our analysis of international differences in product per worker among the several sectors is to distinguish the two major subdivisions of the S-sector--transport and commerce combined, and other services.

In Table 19 there is the usual double set of comparisons, one based on distributions for a differing number of countries grouped by the shares of the industrial sectors in national product and in labor force (lines 1 and 8); the other based on countries for each of which we have the industrial structure of both labor force and national product (lines 2-6 and 9-14). All sets of measures indicate that the median product per worker in both the T+C and the OS subdivisions of the S-sector are above the countrywide; and all of them show that the product per worker in the transportation plus commerce subdivision is distinctly larger than that in other services. For the samples of identical countries this latter finding is true of 20 out of 33 countries (labor force including unpaid family labor) and of 20 out of 28 countries (labor force excluding unpaid family labor).

The transport and commerce subdivision is dominated by trade; transport and communication account for a much smaller proportion of total labor force. It is largely then in trade that we find product per worker higher than both the countrywide average and the per worker product for any other major sector, including other services. The reasons may lie in the composition of the labor force and the proportion of property income, the two complexes of factors already discussed in connection with Table 17. It is quite likely that the relative weight of property income is larger here than in any other sector, even other services; and that much of it is distributed to recipients outside the labor force attached to this subdivision. If so, the product per worker shown for the transportation and commerce subdivision exaggerates income per person engaged in it, and relatively more so than in other sectors. Furthermore, it is also quite possible that, especially in the less developed countries, this group in the labor force--engaged in trading operations--manages, for reasons already suggested, to secure an income per active person higher than in the A- or the M-sector, or in other services. It must be remembered that the latter includes domestic and other personal services for which per worker compensation tends to be quite low.

The range of international differences in the relative levels of per worker product in the two subdivisions of the S-sector is quite wide, particularly for transport and commerce. We can now test for the association with levels of economic attainment, as reflected in total product per capita (Table 20).

First, for labor force including and excluding unpaid family labor, the relatives of per worker product to countrywide product per worker, for both subdivisions

Table 19 Medians and Quartile of Product per Worker in the Transportation and Trade and Other Services Sectors, Expressed as Relatives of National Product per Worker, Recent Years (excluding Communist Countries)

	T C (1)	OS (2)	(T+C)/OS (3)
A Labor Force Including Unpaid Family Labor			
1 Relatives of medians in Table 5 and 12	1.56	1.28	1.22
Relatives derived directly, sample of 33 countries			
2 Median (arith. mean of 3 items)	1.43	1.28	1.18
3 Lowest (arith. mean of 3 items)	0.92	0.86	0.48
4 First quartile (arith. mean of 3 items)	1.07	1.04	0.91
5 Third quartile (" " " ")	2.18	1.91	1.58
6 Highest (" " " ")	8.53	3.38	2.95
7 Number of countries with relatives below 1.0	7	5	13
B Labor Force Excluding Unpaid Family Labor			
8 Relatives of medians in Table 5 and 12	1.36	1.09	1.25
Relatives derived directly, sample of 28 countries			
9 Median (arith. mean of 4 items)	1.36	1.11	1.15
10 Lowest (arith. mean of 3 items)	0.78	0.69	0.54
11 First quartile (arith. mean of 3 items)	0.98	0.90	0.92
12 Third quartile (" " " ")	1.83	1.54	1.50
13 Highest (" " " ")	3.40	1.98	2.82
14 Number of countries with relatives below 1.0	9	9	8

Derived from Appendix Table 5 unless otherwise indicated.

of the S-sector, rise as income per capita declines. In other words, there is a negative correlation between international differences in per capita income and the relative excess of product per worker in both subdivisions of the S-sector over the countrywide product per worker.

Second, the increase in the ratio of per worker product to the countrywide, as national product per capita drops, seems to be distinctly greater for the transport and commerce subdivision than for the other services. Thus, for Classes I and II, the ratios for the samples of identical countries, for labor force including (excluding) family labor, are for the T C subdivision 1.11 (1.06); and rise to 2.75 (1.86) in Classes V, VI, and VII, an increase to more than double (of about eight-tenths). The ratios for the other services subdivision, however, rise from 1.11 (1.00) in Classes I and II to 2.08 (1.42), or less than double (about four-tenths). As a result, the relative differential between per worker product in these two subdivisions of the S-sector tends to increase, as we move down the scale of national income per capita.

Table 20 Arithmetic Means of Transportation and Trade and Other Service Sector Relatives of National Product per Worker, by Groups of Countries Classified by Per Capita Economic Level, Recent Years (excluding Communist Countries)

Economic Level Classes	Derived from Tables 6 and 13			Derived Directly from Sample of Identical Countries			
	T+C	OS	(T+C)/OS	Number of Countries	T+C	OS	(T+C)/OS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A Labor Force Including Unpaid Family Labor							
I	1.01	1.23	0.82	4	0.98	1.24	0.83
II	1.25	0.94	1.33	6	1.20	1.02	1.21
I and II	1.10	1.05	1.05	10	1.11	1.11	1.06
III	1.28	1.18	1.08	6	1.28	1.20	1.10
IV	2.49	1.57	1.59	5	4.08	1.73	2.08
III and IV	1.79	1.34	1.34	11	2.55	1.44	1.55
V	2.06	1.49	1.38	3	2.07	1.50	1.47
VI	2.06	1.87	1.10	6	2.58	2.09	1.33
VII	2.55	2.42	1.05	3	3.75	2.63	1.42
V, VI, VII	2.19	1.80	1.22	12	2.75	2.08	1.39
B Labor Force Excluding Unpaid Family Labor							
I	1.00	1.23	0.81	3	0.97	1.26	0.81
II	1.18	0.83	1.42	5	1.11	0.85	1.32
I and II	1.06	0.99	1.07	8	1.06	1.00	1.13
III	1.21	1.25	0.97	5	1.23	1.17	1.09
IV	1.95	1.38	1.41	3	2.04	1.16	1.78
III and IV	1.52	1.27	1.20	8	1.53	1.17	1.35
V	1.77	1.26	1.40	3	1.83	1.25	1.52
VI	1.66	1.41	1.18	6	1.90	1.52	1.30
VII	2.12	1.03	2.06	3	1.82	1.39	1.64
V, VI, VII	1.79	1.20	1.49	12	1.86	1.42	1.44

Derived from Appendix Table 5 unless otherwise indicated.

Column 7 shows averages of ratios calculated separately for each country and not necessarily equal to ratios of averages in Columns 5 and 6.

In Table 13 we found that the share of transport and commerce in the labor force declines with the decline in total product per capita, more consistently and materially than does the share of other services. Here we find that concurrently with this greater and more consistent decline of the share of transport and commerce in the labor force, there is a greater and more consistent rise in relative product per worker; and concurrently with the lesser and less consistent rise in the share of other services in the labor force there is a lesser and less consistent rise in relative product per worker in that subdivision. There is an economically rational association behind these inverse differentials in the response of the share in the labor force and of relative level of per worker product.

(4) A weighted measure of inequality of sectoral levels of product per worker--We found above that while the product per worker in the A-sector was generally below the countrywide average, it was close to that average in countries with higher per capita income; and much below the countrywide average in the less developed countries, with low per capita income, even though such reduction in relative product per worker in the A-sector did not continue all the way down the scale of economic level classes. We also found that within the non-agricultural segment of the economy, the product per worker in the high level sectors--the S-sector as a whole and the transport and commerce subdivision--was closest to the overall, countrywide average in the higher per capita income countries; and further above the countrywide average in the less developed countries, with lower per capita income. It follows that by and large the relative disparity in sectoral levels of product per worker is inversely related to the levels of economic development: in the countries with higher per capita income, the relative inequality or disparity among sectoral levels or product per worker is narrower; in the countries with lower per capita income it is wider.

A simple measure of weighted relative inequality can be calculated for a given country from the percentage distribution of total product and total labor force. If the share of the A-sector in the former is 30 percent and in the latter is 40 percent, the difference--10 percent--is really the difference between the relative per worker product and the countrywide average (i.e., 0.75 minus $1.0 = -0.25$) weighted by the share of the sector in total labor force (i.e., 40 percent). The sum of the differences between the two percentage distributions, regardless of sign, is a measure of relative inequality among sectoral products per worker, weighted by the share of each sector in the labor force. This index can vary from 0 in the case of perfect agreement of the two distributions, meaning equality of all sectoral levels of product per worker; to close to 200, the latter value being reached in the extreme case when all the product is assigned to just one industrial sector, and when the share of the latter in the labor force is infinitesimally small.

We made this calculation for those countries for which the data were available, using in all but two or three countries, four sectors--A-, M-, and the two major subdivisions of the S-sector (Table 21). There is a fairly wide range among countries in this measure of inequality: the lowest are below 10, the highest are above 100. Differences in the extent of inter-sectoral inequalities in product per worker are thus quite sizeable. The most interesting result, in the lower panel, is in effect a summary of much of the discussion just developed. There is negative correlation between the level of economic development, as measured by income per capita, and the relative inequality of product per worker among its major industrial sectors. The higher the country's income per capita, the narrower the inequality in per worker product among the several major sectors. The lower the country's economic level per capita, the wider the inequality among the major sectors. But it is not without significance that this negative correlation characterizes the range from Class I to about Class IV, and does not extend beyond the latter to Classes V-VII (particularly true when we exclude unpaid family labor). The reason may lie in the major share which a single sector (agriculture) assumes in the labor force in countries with low per capita income, and hence in the closeness with which the A-sector and the whole economy approach each other. Under such conditions, even extreme differences in sectoral levels of product per worker, when weighted, would not lead to a large measure of total inequality.

B. Long-term trends.

From the analysis of international differences in product per worker in the several industrial sectors, we derive the following expectations concerning long-term

Table 21 Medians and Quartiles and Arithmetic Means by Groups of Countries Classified by Per Capita Economic Level of Total Disparity (Measure of Inequality) between the Industrial Structures of National Product and Labor Force, Recent Years (excluding Communist Countries)

		Labor Force Including Unpaid Family Labor		Labor Force Excluding Unpaid Family Labor	
		No. of Countries	Disparity	No. of Countries	Disparity
		(1)	(2)	(3)	(4)
A Partition Values					
Median (arithmetic mean of 3 items)			32.3		22.3
Lowest	"		7.3		6.0
First quartile	"		19.9		12.8
Third quartile	"		52.6		38.3
Highest	"		85.8		55.7

B Arithmetic Means by Economic Level Classes

I	7	17.0	6	17.9
II	6	27.0	5	13.9
I & II	13	21.7	11	16.1
III	6	24.6	5	22.3
IV	6	60.9	4	43.2
III & IV	12	42.8	9	31.6
V	5	42.3	4	28.2
VI	7	42.5	7	30.5
VII	4	55.4	4	27.8
V, VI & VII	16	45.7	15	29.2

Derived from Appendix Tables 1 and 3.

changes that should accompany economic growth and rise in per capita income. The relative product per worker in the A-sector should rise from values well below 1.0 in terms of the countrywide average; whereas the product per worker in the M+S sector should drop from well above 1.0, the relative disparity between product per worker in the A- and the M+S sectors becoming narrower. However, these trends would be observed only to the extent that our time periods correspond, as it were, to the range from Class IV to Class I, but not to the range from Class VII to Class IV. Product per worker in the M-sector, relative to the countrywide average, should show an upward trend, if we deal with labor force including unpaid family labor; but that of the S-sector, again relative to the countrywide average, should decline, the relative disparity in product per worker between the M- and S-sectors thus narrowing progressively. Finally, within the S-sector, the product per worker in the transport plus commerce subdivision relative to the countrywide average, should decline more than in the other services subdivision; and the disparity, in favor of the former, should also decline progressively.

It would have been of interest to test all these expectations, but unfortunately long-term series on both national product and labor force by industrial sectors are

available for only a few countries; and in some of those the discrepancies between the two series are too marked to permit calculation of reliable inter-sectoral differentials in product per worker, particularly over the earlier periods. Table 22 assembles the results of comparisons for 15 countries for which long-term changes in relative levels of sectoral product per worker can be derived. In general, we limited the period of coverage to the 20th century, since data can be extended into the 19th century for very few countries, and these earlier data are subject to much greater error. Also, we were compelled to use labor force including unpaid family labor. Finally, the calculations were limited to the three major sectors: subdivisions within the S-sector can be established for three or four countries over sufficiently long periods, but here again the small sample and the possible wide errors bar effective analysis.

(1) In six countries (Denmark, Germany, Netherlands, Sweden, the United Kingdom, and the United States), product per worker in the A-sector, relative to the countrywide average, does rise; and in two more, Norway and the Union of South Africa, it rises relative to the level of product per worker in the M S sector. In Japan, one estimate also shows a rise in relative product per worker in the A-sector, but the other indicates a decline. In the six remaining countries, the long-term trend in relative product per worker in the A-sector is downward.

This mixed result is due partly to peculiarities of our sample. It includes two countries, Australia and New Zealand, in which the initial relative levels of product per worker in the A-sector were quite high, an atypical condition. With these excluded, we are left with eight rises, one doubtful case, and four declines. Of the latter, two (Italy and Hungary) occur in countries which we now put in Class IV (see Appendix Table 9); and our cross-section analysis would not lead us to expect a rise in relative product per worker in the A-sector in that range of economic level classes. While this may be stretching a point, I would be inclined to argue that the results of Table 22, bearing upon the movement of the relative product per worker in the A-sector, are consistent with the findings of the cross-section analysis.

(2) By and large, the relative product per worker in the M-sector rises over time. This is true in 11 out of 14 countries; and in many the long-term rises are substantial. The declines occur in three countries in which the initial product per worker in the M-sector, relative to the countrywide average, is quite high. This fairly wide generality with which the product per worker in the M-sector rises relative to the countrywide averages, is somewhat beyond what we would expect from the analysis of international differences. Such generality is even more clearly observed in rises in the product per worker in the M-sector relative to those in the S-sector: we find it in 12 of the 14 countries, with New Zealand and the Union of South Africa the only exceptions. And this finding is what we would expect from the association established in the analysis of international differences.

(3) We should expect the product per worker in the S-sector, relative to the countrywide average, to decline. Such declines are found in 11 out of 14 countries, the three exceptions being Hungary, Australia, and New Zealand. If we discount the latter two as rather atypical, the generality of a downward trend in the ratio of product per worker in the S-sector to the countrywide average is impressive.

(4) In Column 7 of Table 22 we have measures of inequality among the sectors in product per worker, weighted by the shares of these sectors in the labor force. These measures are based upon the percentage distributions of total product and labor force among the three major sectors, A-, M-, and S-; and, as expected

Table 22 Long-Term Changes in Relative Levels of Product per Worker, Major Industrial Sectors, Fifteen Countries

	A (1)	M+S (2)	A/(M+S) (3)	M (4)	S (5)	M/S (6)	Measure of Inequality (7)
<u>Denmark</u>							
1 1890-99	0.69	1.26	0.55				28.4
2 1947-52	0.83	1.05	0.79				7.8
3 Change (2-1)	+0.14	-0.21	+0.24				-20.6
<u>France</u>							
4 (1896)(1892, 1898)	0.76	1.23	0.62	1.19	1.28	0.93	24.0
5 (1950)(1949) ^a	0.70	1.15	0.62	1.34	0.95	1.40	24.0
6 Change (5-4)	-0.06	-0.08	0.00	+0.15	-0.33	+0.47	0.0
<u>Germany</u>							
7 (1895)(1890-99)	0.47	1.30	0.36	0.72	2.22	0.32	60.0
8 (1933)(1930-38)	0.48	1.21	0.40	1.08	1.38	0.78	30.6
9 Change (8-7)	+0.01	-0.09	+0.04	+0.36	-0.84	+0.46	-29.4
<u>Netherlands</u>							
10 (1909)(1913)	0.57	1.17	0.49	0.76	1.57	0.48	41.0
11 (1947)(1947-54)	0.66	1.08	0.61	1.23	0.98	1.26	17.0
12 Change (11-10)	+0.09	-0.09	+0.12	+0.47	-0.59	+0.78	-24.0
<u>Norway</u>							
13 1910	0.50	1.44	0.35	0.99	1.85	0.54	46.0
14 1950	0.47	1.21	0.39	1.06	1.36	0.78	31.6
15 Change (14-13)	-0.03	-0.23	+0.04	+0.07	-0.49	+0.24	-14.4
<u>Sweden</u>							
16 (1900)(1899-1901)	0.53	1.58	0.34	1.14	2.29	0.50	51.8
17 (1950)(1949-51)	0.64	1.09	0.59	1.23	0.95	1.29	17.8
18 Change (17-16)	+0.11	-0.49	+0.25	+0.09	-1.34	+0.79	-34.0
<u>United Kingdom</u>							
19 (1891)(1895)	0.64	1.06	0.60	0.69	1.71	0.40	44.8
20 (1951)(1948-54)	1.08	1.00	1.08	0.98	1.02	0.96	1.6
21 Change (20-19)	+0.44	-0.06	+0.48	+0.29	-0.69	+0.56	-43.2
<u>Italy</u>							
22 (1901)(1896-1905)	0.77	1.34	0.57	0.95	1.92	0.49	30.0
23 (1954)(1950-54)	0.64	1.25	0.51	1.28	1.22	1.05	28.2
24 Change (23-22)	-0.13	-0.09	-0.06	+0.33	-0.70	+0.56	-1.8
<u>Hungary</u>							
25 (1900)(1899-1901)	0.82	1.26	0.65	1.36	1.18	1.15	20.0
26 (1941)(1939/40- 1942/43)	0.54	1.46	0.37	1.62	1.32	1.23	45.8
27 Change (26-25)	-0.28	+0.20	-0.28	+0.26	+0.14	+0.08	+25.8

Major		(1)	(2)	(3)	(4)	(5)	(6)	(7)
	<u>Japan</u>							
Measure of	28 (1897 & 1902)(1898-							
inequality	1902) Yamada	0.49	2.21	0.22	1.72	2.62	0.66	71.6
(7)	29 (1897 & 1902)(1898-							
	1902) Ohkawa	0.69	1.73	0.40	1.60	1.84	0.87	43.0
	30 (1950)(1947-54)	0.50	1.47	0.34	1.47	1.46	1.01	48.0
28.4	31 Change (30-28)	+0.01	-0.74	+0.12	-0.25	-1.16	+0.35	-23.6
7.8	32 Change (30-29)	-0.19	-0.26	-0.06	-0.13	-0.38	+0.14	+5.0
-20.6								
	<u>Union of South Africa</u>							
	33 (1911)(1911/12)	0.27	2.04	0.13	2.21	1.93	1.15	85.8
24.0	34 (1946)(1944/45)	0.25	1.66	0.15	1.69	1.64	1.03	70.6
24.0	35 Change (34-33)	-0.02	-0.38	+0.02	-0.52	-0.29	-0.12	-15.2
0.0								
	<u>Canada</u>							
	36 (1901)(1900)	0.78	1.17	0.67	0.96	1.38	0.70	22.0
60.0	37 1950-53	0.67	1.09	0.61	1.14	1.05	1.09	14.0
30.6	38 Change (37-36)	-0.11	-0.08	-0.06	+0.18	-0.33	+0.39	-8.0
-29.4								
	<u>United States</u>							
	39 (1900)(1889, 1899,							
41.0	1899-1908)	0.46	1.31	0.35	0.86	1.73	0.50	48.6
17.0	40 (1950)(1947-54)	0.59	1.06	0.56	1.09	1.04	1.05	10.8
24.0	41 Change (40-39)	+0.13	-0.25	+0.21	+0.23	-0.69	+0.55	-37.8
	<u>Australia</u>							
46.0	42 1891	1.39	0.86	1.62	0.76	0.90	0.84	20.6
31.6	43 1939	0.82	1.05	0.78	0.99	1.07	0.93	7.4
-14.4	44 Change (43-42)	-0.57	+0.19	-0.84	+0.23	+0.17	+0.09	-13.2
	<u>New Zealand</u>							
51.8	45 1901	1.60	0.75	2.13	1.04	0.66	1.58	36.8
17.8	46 1936	1.39	0.87	1.60	0.75	0.90	0.83	20.0
-34.0	47 Change (46-45)	-0.21	+0.12	-0.53	-0.29	+0.24	-0.75	-16.8

Where two sets of dates are given the first is for labor force and the second is for national product.

Columns 1-6 derived from Appendix Table 6, and Column 7 from Appendix Tables 2 and 4.

a. Average of two estimates.

from our cross-section analysis, we find that with the growth of product per capita, the weighted inequality of sectoral products per worker diminishes. The only exceptions are France, Hungary, and one estimate for Japan.

(5) As the mathematical appendix shows, it is impossible for all sectoral products per worker, when expressed in relatives of the countrywide average, to rise or even be constant--if the shift over time involves an increasing share of the sectors with higher than average product per worker. Some must decline, and all can decline. And this is what we find in Table 22. In Columns 1 and 2 (for A- and M+S sectors) we find divergent sign of change in most countries; but interestingly

enough declines in both for several (France, Norway, Italy, one of the estimates for Japan, the Union of South Africa, and Canada). However, when we distinguish three sectors, divergent signs are found in all countries, with the exception of one estimate for Japan and the Union of South Africa.

(6) Table 22 permits us to see in how many cases the rise in product per worker in the A-sector was greater or lower than that in the M-sector or the S-sector; and likewise as between the M- and S-sectors. If we exclude the rather atypical cases of Australia and New Zealand, and accept the Ohkawa estimate for Japan, the results are as follows: the rise in product per worker in the A-sector is greater than in that of the M-sector in only 3 out of 12 cases, but is greater than in that of the S-sector in all but one case. The rise in the product per worker in the M-sector is thus greater than that in the A-sector in 9 out of 12 countries, and greater than that in the S-sector in all countries without a single exception. There is little doubt that the evidence in Table 22 emphasizes the greater rises in product per worker in the M- and the A-sectors, and the much lesser rise in that in the S-sector.

V. Some Implications of the Findings

In this final section, we first apply the findings to international differences in per capita product, and to the rise in per capita income over time; and then conclude with a few general comments on the limitations and implications of the findings.

A. International differences in industrial structure of labor force and their effect on differences in national product per capita.

We know from the preceding discussion that countries in the several economic level classes differ both in the industrial structure of their labor force and in the absolute levels of product per worker within each industrial sector. It may be of interest to calculate how much of the difference in per capita income among the several economic level classes is due to differences in industrial structure of the labor force, and how much to intra-sectoral differences in product per worker.

The calculation in Table 23 is naturally quite crude, and more in the nature of a suggestive illustration than of significant analysis. In Column 1 we have the indexes of per capita income for Classes I-VII, and with the help of current ratios of labor force to total population, we can translate them into indexes of product per worker--using labor force either including or excluding unpaid family labor. On the former basis, the range in product per worker from Class I to Class VII is about 17.5 to 1; but it drops sharply when we exclude unpaid family labor, to about 10 to 1.

We know from our previous discussion the relative levels of product per worker in the several major industrial sectors--within each economic level class. If we assume one distribution of labor force among the major sectors for all classes (and we assumed here the one prevailing in developed countries) it is possible to recalculate the countrywide index of product per worker for each economic level class--using this assumed "developed" industrial distribution of the labor force. This was done separately for labor force including and excluding unpaid family labor; and separately for an industrial structure which subdivides the S-sector into the two divisions and for one which treats it as a whole.

The results are of some interest. If we deal with labor force including unpaid family labor, the international inequality of product per worker is substantially

Table 23 Calculation of the Index of National Product per Worker Under Two Assumptions of the Shares of Major Industrial Sectors, Recent Years (excluding Communist Countries)

Economic Level Classes	Index of Per Capita Product	Share of Labor Force in Population (%)	Index of Product Per Worker (1 ÷ 2)	Index of Product per Worker	
				Assump- tion I	Assump- tion II
		(1)	(2)	(3)	(4)

A Labor Force Including Unpaid Family Labor

I	1,700	42	4,050	4,101	4,238
II	1,000	44	2,270	2,513	2,502
III	650	39	1,670	1,794	1,802
IV	400	44	910	1,674	1,908
V	270	38	710	954	1,027
VI	200	41	490	773	828
VII	100	44	230	702	746
I & II (unweighted average)	1,350		3,160	3,307	3,370
VI & VII "	150		360	738	787
I/VII	17.0		17.6	5.8	5.7
(I & II)/(VI & VII)	9.0		8.8	4.5	4.3
(I & II)/V	5.0		4.5	3.5	3.3

Assumption I: A = 13%; M = 39%; S = 48%.

Assumption II: A = 13%; M = 39%; T C = 24%; OS = 24%.

B Labor Force Excluding Unpaid Family Labor

I	1,700	40	4,250	4,292	4,494
II	1,000	38	2,630	2,680	2,680
III	650	36	1,810	1,900	1,910
IV	400	33	1,210	1,603	1,640
V	270	31	870	1,081	1,146
VI	200	32	625	792	826
VII	100	24	420	559	577
I & II (unweighted average)	1,350		3,440	3,486	3,587
VI & VII "	150		522	676	702
I/VII	17.0		10.1	7.7	7.8
(I & II)/(VI & VII)	9.0		6.6	5.2	5.1
(I & II)/V	5.0		4.0	3.2	3.1

Assumption I: A = 10%; M = 40%; S = 50%.

Assumption II: A = 10%; M = 40%; T C = 25%; OS = 25%.

Column 1: based upon UN estimates of national income. For countries included in each economic class see Appendix Table 9.

Column 2: derived from Appendix Table 8.

Columns 4 and 5: the underlying estimates of product per worker, expressed as relatives of national product, are from Table 16, Column 5; Table 18, Columns 5 and 6; and Table 20, Columns 5 and 6.

reduced--if we assume a shift in composition of the labor force away from agriculture toward manufacturing and services. The range from Class I to VII is cut to about a third of its initial span--from 17.5 to 1 to below 6 to 1. If we exclude unpaid family labor, the effect is much less marked; the range is reduced from about 10 to 1 to somewhat below 8 to 1. And there is a similar difference in effect when we observe the range from combined Classes I and II to the combined Classes VI and VII.

If we emphasize the distribution of the labor force excluding unpaid family labor, as the more comparable, the conclusion is that if we assume, artificially, that the industrial structure in the underdeveloped countries is shifted toward the pattern of developed countries--even though we retain the contrast between the high relative per worker product in the M- and S-sectors and the low one in the A-sector--the international differences in per worker product still remain quite high. In other words, the differences among the countries in the industrial structure of the labor force are of much smaller weight in determining inequalities in total product per worker than are the intra-sectoral differences in levels of output per worker. And my conjecture would be that this conclusion would stand even if we could operate with a more detailed industrial classification--provided, of course, that we would not make levels of per worker output themselves criteria in distinguishing one industrial sector from another.

To put it simply: the major source of international differences in countrywide output per worker (and per capita) between developed and underdeveloped countries is not that the full-time labor forces of the former and of the latter are distributed differently among the several industrial sectors that can reasonably be distinguished. It is rather in the fact that within each sector proper--within agriculture, within mining, within manufacturing, within transportation and trade, etc.--the product per worker in the underdeveloped countries is so much lower than in the developed.

B. Association between growth in per capita product and shifts in the industrial structure.

The effects of differences in industrial structure of labor force, just noted in connection with international disparities in countrywide product per worker, can also be observed in growth over time. How much of the total growth in product per worker in the several countries was associated with shifts of the labor force toward sectors with higher than average levels of product per worker?

The first two columns of Table 24 shed some light on this question, although the data are for only a limited number of countries and we have to compare effects of shifts in industrial distribution of the labor force (including unpaid family labor) with rate of growth in national product per capita. But this is not a major qualification: we know that, in general, labor force grew at least as rapidly as total population, and hence the rate of growth in product per worker would be equal to or somewhat less than that in product per capita.

The calculation for Column 3 uses the sectoral levels of product per worker at the beginning of the period and tends to exaggerate the effects of inter-sectoral shifts, compared with the use of the end or the middle of the period levels as weights. In other words, the entries in Column 3 are slight over-estimates of the effects of shifts in the industrial distribution of the labor force. Since the entries in Column 2 are probably slight over-estimates of the rate of growth in real product per worker, we can compare the entries in the two columns without committing grave errors.

Table 24 Comparison of Rate of Growth in National Income per Capita with the Effects and Magnitudes of Shifts in Industrial Structure of Labor Force, First Half of Twentieth Century

Country	% Rate of Growth per Decade National Product Per Capita (1)	% Rate of Growth per Decade, Product per Worker, Ascribable to A-M-S-Shift (2)	Total Change in % Shares, in Labor Force of A, M, S (3)	Proportional Decline in Share of A-sector in Labor Force (4)	Proportional Decline in Total Inequality (5)
United Kingdom	11.0	2.8	34	0.67	0.96
Ireland-Eire	16.3	nd	28	0.30	nd
France	10.4	1.4	32	0.33	0.0
Germany	8.3	2.5	14	0.19	0.49
Switzerland	15.3	nd	18	0.26	nd
Netherlands	9.0	2.9	22	0.32	0.59
Denmark	16.7	nd	45	0.49	nd
Norway	23.4	3.7	36	0.38	0.31
Sweden	29.2	8.0	70	0.64	0.66
Italy	14.2	2.6	37	0.31	0.06
Spain	5.6	nd	37	0.27	nd
Hungary	8.7	1.0	18	0.15	-1.29
United States	16.4	4.9	50	0.68	0.78
Canada	17.0	2.0	43	0.51	0.36
Union of South Africa	23.8	5.5	24	0.20	0.18
Japan (Ohkawa)	21.7	4.0	43	0.31	-0.12
Australia	9.5	-0.9	14	0.23	0.64
New Zealand	11.8	-1.3	11	0.17	0.46

Rank coefficients of correlation: Columns 1 and 2 - +0.68

Columns 1 and 3 - +0.54

Columns 1 and 4 - +0.44

Columns 1 and 5 - -0.01

Column 1--Rates are for national income, in constant prices, per capita; and are the estimates given in the first paper in this series (see *Economic Development and Cultural Change*, Vol. V, No. 1). Table 1, p. 10). The rates are for a period covering roughly the first half of the 20th century; and while the periods in this and the following columns are not identical, they are sufficiently comparable.

Column 2--The underlying calculations assume that the relative levels in product per worker (for the three major sectors and for labor force including unpaid family labor) remain the same as at the beginning of the period; and only percentage shares of the three sectors in total labor force change. The total change in countrywide product per worker, due to these inter-sector shifts of shares in the labor force, is then reduced to a per decade basis (along a log line).

Column 3--Sums of changes, regardless of sign, in percentage shares of the three major sectors in labor force, including unpaid family labor, between the beginning and the end of the period covering the first half of the 20th century.

(Notes continued next page.)

(Notes to Table 24 continued)

Column 4--Declines in the share of the A-sector in labor force, including unpaid family labor, expressed as proportions of the initial level of the shares. The declines cover the same period as the total change in Column 3. The data underlying entries in Columns 2-4 are from the appropriate appendix tables.

Column 5--Calculated from Table 22, Column 7.

The general conclusion is that the shift from agriculture toward higher product per worker sectors did contribute to the growth of national product per capita. In the United States, Sweden, and the Union of South Africa, in all of which growth in income per capita was quite high, the inter-sectoral shifts contributed a quarter, a third, or over a third of the total rise. The same was true in the Netherlands and the United Kingdom, with lower over-all rates of growth in per capita income. But in other countries, the contribution of the inter-sectoral shift has been quite moderate; and in Australia and New Zealand it tended, in fact, to depress the over-all rate of growth. Yet, by and large, there is a significant positive association between the rate of growth in per capita income and the contribution of the shift in the industrial structure of the labor force: the rank coefficient of correlation for the 14 countries included in the comparison is $+0.68$ --statistically significant for that number of cases.

Columns 3-5 indicate the association between the rate of growth of income per capita and the magnitude of the changes in industrial structure which we have been discussing in the preceding sections. One may argue that, in general, if real income per capita is growing rapidly, the accompanying changes in the industrial structure of the labor force or of total product, or of some aspects of both, should also be large; whereas moderate changes in per capita product should be accompanied by relatively moderate shifts in industrial structure.

This hypothesis is tested in terms of the industrial structure of the labor force, rather than of national product, because the data for the former are more plentiful. In the sample of eighteen countries, the total shift in the percentage distribution of labor force (including unpaid family labor) among the three major sectors tends to be large in countries with high rates of growth of per capita income; and vice versa. This positive association is reflected in the coefficient of rank correlation of $+0.54$ --statistically significant for that number of cases. The association between the magnitude of the proportional decline in the share of the A-sector in the labor force and the rate of growth of real income per capita is also positive, although not as high. The rank correlation coefficient is $+0.44$ --barely significant for that number of cases.

The association between the rate of growth of product per capita and the magnitude of shifts in the industrial composition of national product would probably not be as close. For it must be remembered that the share of the S-sector in national product is relatively invariant to levels of per capita income, particularly in the higher economic level classes.

This expectation is partly confirmed by the lack of association between the reduction in total inequality in sectoral product per worker levels and the rate of growth of real income per capita (Columns 5 and 1). Here the coefficient of rank correlation is zero. In some countries--like the United States, the United Kingdom, and Australia--the inequality was reduced much more than one would expect from the rates of growth of per capita income; whereas in others--like Japan, the Union of South Africa, and France--the inter-sectoral inequality was reduced (if at all) much less than one

would expect, judging by the rates of growth in per capita income. Hence, on the basis of the present sample, and perhaps in general, one can argue that there is no simple, one-way association between rates of growth in per capita income and inequality among sectoral levels of product or income per worker and per capita. In some phases of development and in some countries, high rates of growth in per capita income may be accompanied by a great reduction in such inequality; in other phases and countries, high rates of growth in per capita income may be associated with maintenance or even increase in inter-sectoral inequality in product per worker.

C. Concluding comments.

The preceding discussion has been an attempt to organize a large body of statistical data relating to an important structural aspect of economic growth of nations. The main purpose has been to establish some semblance of order, so that the general features of the process could at least be suggested and some explanatory hypothesis advanced to link the various aspects of the findings.

It need hardly be stressed that the general conclusions that have been suggested, and the whole attempt are subject to several major qualification. These may be listed briefly as indications of directions that further work might take.

(1) Perhaps the most important qualification arises out of the bias in the supply of long-term series. These are available largely for the presently developed countries within the orbit of Western European civilization; and even for most of them, reliable data are now lacking for the crucial early periods of transition from the pre-industrial to the industrial system. In some countries outside of that orbit, notably Japan, the available estimates differ substantially. And while the greater wealth of cross-section data for recent years is a help, it is far from an adequate substitution for long-term records covering the successive phases of growth in a variety of countries. Inclusion of the Communist countries in the analysis would have only multiplied the difficulties, since the official statistics (and there are no others) do not follow the accepted standards of empirical research. As a result, we have to grope for some general features of the growth process on the basis of a sample that is both scanty and biased.

(2) Even within this limited sample, there are great differences among countries with respect to size, area, natural conditions, and cultural and historical heritage. Yet the only limitation we introduced was the exclusion of units that in recent years had population of less than a million; and the only characteristic that we distinguished was the level of income per capita. Otherwise we treated all countries as if they were so many comparable counters, regardless of the fact that some were large, some small; some in temperate climates, others in subtropical climates; some endowed with great natural resources, others not so endowed; some with a long history of independence behind them, others still colonies even if with a fair amount of economic self-government. It may well be that when and if further distinctions are drawn, new aspects of the industrial structure of product and labor force in its bearing upon economic growth will emerge.

(3) We distinguished only the major industrial sectors. Each of these is in turn a conglomerate of many diverse branches, so that when we compare the M-sector in one group of countries with that in another group, it may be claimed that we deal with categories that are the same in name only. In one group the M-sector may be dominated by advanced industries, producing elaborate producer or consumer goods requiring complex tools and application of the most abstruse results of modern science;

in another group the dominant industries may be simple handicrafts limited to the more primitive types of consumer goods. Indeed, it could be argued that the very striking differences in product per worker among the A-sectors in the countries in Class I and say Classes V to VII raises serious doubts that we deal here with one and the same category. Yet some comparability in the function of the broad industrial sectors must exist. And all that can be said is that greater detail in the industrial classification might reveal additional similarities and differences, now concealed because of our use of broad divisions in the productive economic structure.⁶

(4) Even for the broad industrial sectors, the analysis of productive factors is limited to the number in the labor force. Many of the observed differences would presumably become more meaningful if it were possible to deal with the qualities of the labor force reflected in its age, sex, structure, and training and skill; or with other factors of production, particularly capital investment, which must differ widely among the several sectors, among countries at different economic levels, and over time within one and the same country.

(5) Finally, only incidental reference could be made to differential pricing of factors and products in the several sectors, among countries in various economic level classes, and among periods within the same country. Yet it is possible, for example, that the greater spread between product per worker in the A- and the M S sectors in the underdeveloped countries than in the more developed countries is due, at least in part, to a greater relative difference in pricing of comparable products and productive factors between the countryside and the cities at the lower economic levels.

Despite all these qualifications, despite the limitations of data, despite the crudity of the classifications and distinctions, some order does emerge; and one for which the economic rationale can be discerned. Nor do these qualifications invalidate the findings made so far. In other words, we have some preliminary impressions from the initial attempt to order the data in some meaningful fashion. They are not necessarily wrong because they are preliminary: they may be enriched by further study, and some of the specific connections drawn and hypotheses advanced may have to be reformulated after additional data and research become available. But there is no reason to assume that these conclusions will have to be recast ab ovo.

Above all, it must be stressed that these industrial structure aspects of economic growth carry with them wide and far-reaching implications for other aspects of the economic structure of nations in the process of their growth. The shift from agriculture to other sectors means urbanization and the numerous corollaries which this change in mode of life implies; it means a shift from small, individually managed enterprises, to large-scale productive units, often organized in even larger economic management units--with all the implications that follow for economic status of human beings and the division of society into economic and social classes; it means far-reaching changes in the structure of final use of national product, with its division between consumption and investment, and various

6. A relevant generalization is that advanced by Walther Hoffmann concerning shifts in proportions of consumption goods and capital goods industries in the process of industrialization (see his Stadien und Typen der Industrialisierung, Jena, 1931). I hope to deal with this thesis in a later paper bearing on trends in capital formation and ultimate consumption proportions.

categories within each; and it means a more complex economic structure which inevitably brings in its wake widening economic activities of the state.

At least some of these aspects of economic structure, of component distributions of aggregate national product, will be discussed in other papers in this series. Thus, even if we cannot, for the time being, pursue a more detailed analysis of the industrial structure proper, some of the findings suggested here will be tested and amplified further by tracing international differences and changes over time in those other aspects of the economic structure of nations, the findings for which can be juxtaposed with the conclusions of the present discussion.

MATHEMATICAL APPENDIX

Analysis of Changes in Relative Product per Worker with a Shift in Labor Force from Agriculture to Non-Agriculture

Designate:

- A_0 - product per worker in agriculture, time 0 or country 0
- B_0 - product per worker in non-agriculture, time 0 or country 0
- T_0 - product per worker, countrywide, time 0 or country 0
- C_0 - share of agriculture in labor force, time 0 or country 0
- D_0 - share of non-agriculture in labor force, time 0 or country 0
- $C_0 + D_0 = 1$
- r_a - rate of increase in A_0 over time, or relative difference between country 0 and country 1, so that $A_1 = A_0 (1 + r_a)$
- r_b - likewise for B_0 compared with B_1 ; $B_1 = B_0 (1 + r_b)$
- r_t - likewise for T_0 compared with T_1 ; $T_1 = T_0 (1 + r_t)$
- X - change over time, or difference between country 1 and country 0 in share of non-agriculture in labor force.

$$X > 0$$

$$C_1 = C_0 - X$$

$$D_1 = D_0 + X$$

$$C_1 + D_1 = C_0 + D_0 = 1$$

We can then see that:

$$T_0 = A_0 C_0 + B_0 D_0$$

$$T_1 = A_1 C_1 + B_1 D_1 =$$

$$= [A_0 (1 + r_a)] (C_0 - X) + [B_0 (1 + r_b)] (D_0 + X) =$$

$$= (A_0 + A_0 r_a) (C_0 - X) + (B_0 + B_0 r_b) (D_0 + X) =$$

$$= A_0 C_0 + A_0 C_0 r_a - A_0 X - A_0 r_a X + B_0 D_0 + B_0 D_0 r_b + B_0 X + B_0 r_b X$$

$$= (A_0 C_0 + B_0 D_0) + (A_0 C_0 r_a + B_0 D_0 r_b) + X [B_0 (1 + r_b) - A_0 (1 + r_a)]$$

$$\frac{T_1}{T_0} = \frac{T_0 (1 + r_t)}{T_0} = 1 + r_t =$$

$$= \frac{(A_0 C_0 + B_0 D_0) + (A_0 C_0 r_a + B_0 D_0 r_b) + X [B_0 (1 + r_b) - A_0 (1 + r_a)]}{A_0 C_0 + B_0 D_0}$$

$$= 1 + \frac{(A_0 C_0 r_a + B_0 D_0 r_b) + X [B_0 (1 + r_b) - A_0 (1 + r_a)]}{A_0 C_0 + B_0 D_0}$$

Hence:

$$r_t = \frac{A_0 C_0 r_a + B_0 D_0 r_b + X [B_0(1 + r_b) - A_0(1 + r_a)]}{A_0 C_0 + B_0 D_0}$$

If: $r_a = r_b = r$

$$\begin{aligned} \text{Then: } r_t &= \frac{A_0 C_0 r + B_0 D_0 r + X [B_0(1 + r) - A_0(1 + r)]}{A_0 C_0 + B_0 D_0} = \\ &= \frac{r(A_0 C_0 + B_0 D_0) + X(1 - r)(B_0 - A_0)}{A_0 C_0 + B_0 D_0} = \\ &= r + \frac{X(1 + r)(B_0 - A_0)}{A_0 C_0 + B_0 D_0} = r + X(1 + r) \frac{(B_0 - A_0)}{T_0} \end{aligned}$$

Since B_0 , the per worker product in non-agriculture, is larger than A_0 , $(B_0 - A_0) > 0$, and the whole expression following the + sign is positive. Hence $r_t > r$. The excess of r_t over r is:

- (a) positively related to the size of X ,
- (b) positively related to the size of r ,
- (c) positively related to the difference $(B_0 - A_0)$,
- (d) negatively related to T_0 , or $(A_0 C_0 + B_0 D_0)$,
- (e) positively related to $\frac{B_0 - A_0}{T_0}$.

The effect can be shown. If we assume $X = 0.1$, for the given values of r and $\frac{B_0 - A_0}{T_0}$, r_t can be calculated as follows:

	$\frac{B_0 - A_0}{T_0} =$	0.5	1.0	2.0
$\frac{r = 0.05}{r_t}$		0.1025	0.155	0.26
$\frac{r = 0.10}{r_t}$		0.155	0.210	0.32
$\frac{r = 0.15}{r_t}$		0.2075	0.265	0.38

It follows that with the same rate of growth over time or the same proportional difference between countries in A and B, the relative will, under the above conditions (viz. $B_0 > A_0$ and $X > 0$), decline for both. Thus:

$$\frac{A_1}{T_1} = \frac{A_0(1 + r_a)}{T_0(1 + r_t)} = \frac{A_0}{T_0} \cdot \frac{(1 + r)}{(1 + r) + X(1 + r) \frac{(B_0 - A_0)}{T_0}} = \frac{A_0}{T_0} \text{ (fraction less than 1).}$$

Likewise for $\frac{B_1}{T_1}$ compared with $\frac{B_0}{T_0}$.

The following conclusions can be drawn:

1. When the X shift over time, or from country to country, is from a low to a larger product per worker sector, the relative for any sector can remain constant only if its rate of growth over time or its inter-country differential is equal to that of the countrywide per worker level--which means that it must be larger than the relative for all other sectors combined. Naturally, the same condition holds for a rise in the relative of any sector.
2. With the assumed X shift, all sector relatives can decline--even though the rate of growth or the inter-country differential in each is constant and equal. But it is impossible for the relatives for all sectors to rise, or to remain constant.
3. With the assumed X shift, if the relative for any sector is constant or rises, it follows necessarily that its rate of growth over time or the inter-country differential for it is greater than the rates or differentials for the other sectors; and inequality among sectors in rates and differentials must exist.

APPENDIX TABLE 1

National Product, Current Prices, Percentage Distribution by Industry, Recent Years

Region and Country	Concept (1)	Period (2)	Agric., forestry, fishing (3)	Mining, mfg., constr. (4)	All other (5)	Transp., Comm., pub. util. (6)	Pub. Admin. & de- fense (8)	Other Ser- vices (9)
I Europe								
A Western, Northern, and Central								
1 Austria	(a) gnp at market prices	1948-54	15.6	49.2	35.2	8.5	7.8	10.4
2 Belgium	(a) gdp at factor cost	1948-54	8.2	42.5	49.3	8.6	8.2	20.7
3 Denmark	(a) gdp at factor cost	1947-54	20.6 ^a	35.1 ^a	44.3	10.4	7.9	8.8 ^{aa}
4	(b) gdp at factor cost, 1937 prices	1938	22.3 ^a	33.0 ^a	44.7	8.8	7.0	13.3
5 Finland	(a) ndp	1948-54	26.0 ^b	41.2 ^c	32.9 ^c	6.8 ^c	9.0	5.0 ^{aa}
6	(b) ndp	1938	35.4 ^b	29.8 ^c	34.8 ^c	5.9 ^c	7.9	9.2 ^{aa}
7 France	(a) ndp in 1938 prices	1947-49	17.1	37.4 ^c	45.5 ^c	9.4 ^c	12.0	11.9
8	(b) ndp at factor cost	1938	22.4	33.9 ^c	43.7 ^c	10.1 ^c	5.7	13.0
9 Germany, F.R.	(a) ndp	1948-54	11.7	53.6 ^c	34.7 ^c	8.1 ^c	8.7 ^{bb}	8.2
10	(b) ndp	1936	13.4	49.5 ^c	37.1 ^c	8.5 ^c	9.7 ^{bb}	9.5
11 Ireland	(a) ndp	1947-54	32.6	24.8	42.6	16.5	8.5	17.6
12	(b) ndp	1938	25.5	74.5		dd	8.0	66.5 ^{ccdd}
13 Netherlands	(a) ndp	1947-54	13.0	41.1	45.9	20.8	7.2	17.9
14	(b) ndp	1938	7.5	28.9	63.6	11.6	5.7	34.9
15 Norway	(a) ndp	1947-54	15.0	40.8	44.1	14.6	3.5	13.4
16	(b) ndp	1938	14.7	31.5	53.8	15.5	1.9	21.8
17 Sweden	(a) gdp at factor cost	1949-51	12.9	49.9	37.2	8.8	7.1 ^{bb}	21.3
18 United Kingdom	(a) gdp at factor cost	1948-54	5.6	46.2	48.2	10.0	6.5	19.0

B Southern

19	Greece	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
20	(a) ndp		1947-54	37.4	24.1	38.5	6.6	11.1	8.3	12.5
21	(b) ni at factor cost		1938	38.7 ^d	18.0	43.7	5.7	11.1	5.8	20.7
22	(a) gdp at factor cost		1950-54	26.4	39.1	34.5	8.9	12.5	13.1	
23	(b) ndp		1938	28.1	28.1	43.8	7.4	10.4	11.9	14.1
24	(a) gdp at factor cost		1947-54	29.0	36.0	35.0	29.9		5.0	ee
	(b) gdp at factor cost		1938	25.5	36.5	38.0	32.1		5.8	ee

C Eastern

25	Bulgaria ^e	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
26	(b) nmp at factor cost		1939-40	41.9	17.7	40.4	4.3	15.0	8.1	13.0
27	(b) nmp at market prices		1938-39	33.9	37.8	28.3	ff	8.4	-	19.9 ^{ff}
28	(a) nmp in 1937 prices		1947-48	23.7	47.4	28.9	9.4	18.3	-	1.1 ^{gg}
29	(b) nmp at market prices		1938	25.9	20.0	54.1 ^f			-	7.5
			1952-53	28.9	51.7	19.4	4.8	7.1	-	

II Asia

30	Burma	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
31	(a) gdp at market prices		1951-54	45.5	13.8	40.7	2.1	24.9	8.2	5.6
32	(a) gni at factor cost		1947	54.7	8.5	36.8	2.5 ^{hh}	8.1	19.0 ^{bb}	7.2
33	(b) ndp at factor cost		1938	57.4	8.8	33.8	1.6 ^{hh}	11.8	11.3 ^{bb}	9.1
34	(b) nmp at factor cost		1931-36	63.9	11.6	24.6	0.9	7.2	16.5	
35	(a) ndp		1948-53	49.9 ^g	17.0	33.1	17.2		4.6	11.4
36	(a) ndp		1951-52	56.1 ^h	11.8 ^c	32.1 ^c	3.0 ^c	14.3 ^{aa}	6.1	8.7 ^{aa}
37	(a) ndp		1952-53	12.2	26.9	60.8	9.6	11.6	20.6	19.0
38	(a) ndp		1947-54	24.4	31.5	44.1	7.7	15.8	20.6	
39	(b) ndp		1938	20.0	34.5	45.5	10.5	13.0	3.0	19.0
	(a) gnp at market prices		1949							
40	(a) ndp		1952-54	50.9 ⁱ	13.9	35.2	2.5	7.9	8.8	16.0 ⁱⁱ
41	(a) ndp or ni		1948-54	19.3	16.6	64.1	4.6	29.9	6.4	23.2
42	(a) ndp		1949-53	60.4	6.8 ^j	32.8 ^j	2.8	9.9	5.4 ^{bb}	14.8 ^{jj}
43	(b) nmp at market prices		1947-53	40.5	18.0	41.5	3.4	12.0 ^{aa}	6.2 ^{bb}	20.0 ^{aa}
44	(a) ndp in 1937 prices		1938	29.5	41.6 ^k	28.9	3.4	12.5 ^{aa}	5.6 ^{bb}	7.5 ^{aa}
45	(b) ndp in 1937 prices		1948-54	36.8	20.4	42.8	8.4	15.8	9.5	9.0
			1937	36.1	27.1	36.8	7.5	17.2	5.1	7.0

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
46 Thailand	(a) gdp at market prices	1947-53	54.1	14.9	31.0	2.7	15.0	5.4	7.9
47	(b) gdp at market prices	1938	45.6	13.1 ¹	41.3	3.5	26.9	4.9	6.0
48	(a) ndp	1948-54	48.5	16.3	35.2	6.3	10.7	9.5	8.7
49	(b) ndp	1938	47.3	16.8	35.9	6.1	10.2	10.4	9.2
III Africa									
50 Belgian Congo	(a) gdp at factor cost	1950-54	33.0	33.1	33.9	8.1	8.6	8.2	9.0
51 Egypt	(a) ndp	1950-53	34.7	10.6	54.7	6.3	14.7	12.4	21.3 ^{kk}
52	(b) ndp	1938-39	49.0	7.9	43.1	3.4	6.6	5.4	27.7
53 Gold Coast ^m	(a) gdp at market prices	1948-50	38.4	11.6 ⁿ	50.0 ⁿ	dd	dd	5.4	44.6 ^{ndd}
54 Kenya	(a) ndp	1947-53	43.8 ^o	16.5	39.7	7.3	16.4 ^{ll}	8.8	7.1 ^{ll}
55 Nigeria	(a) gdp at factor cost	1950/51 & 1952/53	67.2 ^p	10.3 ^q	22.5 ^q	15.1 ^{qmm}	3.9	3.6	-
56 Northern Rhodesia	(a) ndp	1947-53	9.9 ^r	62.8 ^s	27.3	13.4 ⁿⁿ	6.8	7.0 ^{bb}	-
57	(b) ni at factor cost	1938	23.9	34.4	41.7	15.6	18.6	7.5	18.6
58 Nyasaland	(a) ndp	1948	55.5	6.7	37.8	2.6 ^{hh}	13.1	9.9	12.2
59	(b) ni at factor cost	1938	58.0	1.0	41.0	11.3	13.8 ^{oo}	15.9	15.9
60 Southern Rhodesia	(a) ndp	1948-50	25.4 ^r	29.5	45.1	6.0	14.5	7.8 ^{bb}	16.8
61 Uganda	(a) ndp	1950	55.8 ^t	7.9 ^t	36.3	3.2	26.3 ^{aa}	5.4 ^{pp}	1.2 ^{aa}
62 Union of South Africa	(a) ndp	1947-54	15.4	35.6	49.0	8.5 ^{hh}	14.0	9.8 ^{bb}	16.6
63	(b) ndp	1938	12.7	38.3	49.0	6.1 ^{hh}	13.6	29.4	-
IV Northern America									
64 Canada	(a) gdp at factor cost	1948-54	13.0	39.1	47.9	10.9	13.9	5.5	17.6
65	(b) gdp at factor cost	1938	13.2	33.7	53.1	12.0	12.9	6.3	22.0
66 United States	(a) ndp	1947-54	7.2 ^u	37.7	55.1	8.5	17.9	10.7 ^{bb}	18.0
67	(b) ndp	1938	8.8 ^u	27.5	63.7	10.1	17.7	12.6 ^{bb}	23.2
V Latin America									
68 Argentina	(a) gdp at factor cost	1947-54	18.2	28.9	52.9	11.3	16.9	9.7	15.1
69	(b) gdp at factor cost	1938	24.2	20.5	55.3	11.2	14.1	8.7	21.3
70 Bolivia	(a) ndp	1948-50	55.5 ^v	16.1 ^w	28.4 ^w	0.8 ^{wqq}	6.6	4.0 ^{qq}	17.0

71	Brazil	(a) ni	1947-53	34.1	18.5	47.4	7.6	12.7	7.2	20.0
72	Chile	(a) ndp	1947-52	16.7	28.7	54.6	8.1	14.6	7.1	24.8
73		(b) ndp	1940	18.0	27.4	54.6	7.4	16.8	5.3	25.1
74	Colombia	(a) ndp	1947-53	41.0	19.4	39.6	6.7	9.8	6.8	16.3
75	Dominican Republic	(a) nnp at factor cost	1946	43.0 ^t	17.7 ^t	39.3	2.8	20.9 ^{rr}	8.0	7.6 ^{rr}
76	Ecuador	(a) gdp at factor cost	1950-53	39.8	20.7	39.5	5.6	10.4	5.6	17.8
77	El Salvador	(a) gdp at market prices	1950	52.9 ^t	11.7 ^{ix}	35.4 ^x	x	18.2	5.7 ^{bb}	11.5
78	Guatemala	(a) gdp at market prices	1949	45.5	21.4	33.1	14.3	8.5	7.1	3.2
79	Haiti	(a) ni	1951/52	73.7	1.0 ⁿ	25.3 ⁿ	1.4	dd	dd	23.9 ^{cc}
80	Honduras	(a) gdp at factor cost	1947-52	55.5	10.6	33.9	6.7	10.1	2.8	14.3
81		(b) gdp at factor cost	1938	50.7	13.0	36.3	7.0	9.0	3.7	16.8
82	Jamaica	(a) gross value of domestic producty	1943, 1946	22.8	21.5j	55.7	24.8	22.7	8.6 ^{bb}	22.3j
83		(b) ni at factor cost	1938	39.8	5.3	54.9	22.7	22.7	6.4	25.8
84	Mexico	(a) ndp	1947-50	18.8	24.2 ^z	57.0	4.7	32.6 ^{ss}	4.7 ^{tt}	15.0
85		(b) ndp	1939	20.3	24.0 ^z	55.7	6.5	23.7 ^{ss}	7.5 ^{tt}	17.9
86	Nicaragua	(a) gnp at market prices	1950	40.5	25.2	34.3	4.7	10.5 ^{aa}	6.1	13.0 ^{aa}
87	Paraguay	(a) gnp at market prices	1950-54	47.8	18.0	34.2	1.2	14.7	5.7 ^{uu}	12.6
88	Peru	(a) ni	1947-53	39.7	20.5j	39.8j	dd	16.5	10.8	12.6j
89		(b) ni	1942	35.4	22.5j	42.1j	dd	12.5	9.2	20.4j
90	Puerto Rico	(a) ndp	1947-53	19.8	16.6	63.6	4.6	19.7	24.3	15.0
91		(b) ndp	1939	30.4	12.5	57.1	7.0	10.5	18.2	21.3
VI Oceania										
92	Australia	(b) ni	1939	16.9	21.9	61.2 ^f			3.4	28.1
93	New Zealand	(a) ni	1948-53	28.7	29.6	41.7 ^c	10.2 ^c	dd		

Notes to Appendix Table 1

- Sources: U. N. Statistical Papers, Series H, No. 9, for lines 2, 5, 6, 18, 21, 30, 36, 39-41, 44, 45, 48-51, 64-67, 71, 76, 87, 93.
- U. N. Statistical Papers, Series H, No. 8, for lines 1, 3, 4, 9, 10, 13, 14, 22-24, 29, 34, 35, 42, 53-56, 58, 60, 68, 69, 72, 73, 77-81, 84-86, 88-91.
- U. N. Statistical Papers, Series H, Nos. 8 and 9, for lines 11, 12, 15, 16, 19, 37, 38, 46, 47, 62, 63, 74.
- U. N. Statistical Papers, Series E, No. 2, for lines 7, 8, and 52.
- Olof Lindahl, The Gross Domestic Product of Sweden, 1861-1951, Konjunkturinstituten, Stockholm, 1956, for line 17.
- U. N. National Income Statistics, 1938-1947, for lines 25, 32, 43, 57, 59, 75, 83.
- U. N. National Income Statistics, 1938-1948, for lines 20, 26, 27, 31, 82.
- Colin Clark, Conditions of Economic Progress (2nd ed.), London, 1951, for lines 28 and 92.
- T. C. Liu, China's National Income, 1931-1936, Brookings, 1946, for line 33.
- U. N. Statistical Papers, Series H, No. 5, for lines 61 and 70.

- a. Slaughtering and dairy production included in agriculture.
- b. Dairies and farm household labor included in agriculture.
- c. Public utilities included in manufacturing.
- d. Includes agricultural homecrafts.
- e. Kiranoff estimates.
- f. Includes small-scale manufacturing.
- g. Includes processing, etc., by farmer.
- h. Includes government estates.
- i. Includes rent of farm dwellings.
- j. Construction included in "all other".
- k. Includes wages and salaries in forestry.
- l. Excludes construction.
- m. Money economy only.
- n. Manufacturing included in "all other".
- o. Includes major subsistence farming and some processing.
- p. Includes some local transportation and distribution.
- q. Utilities, postal, and communication service included in manufacturing.
- r. Includes African subsistence; excludes some European farmer's income in kind.
- s. Mining only.
- t. Mining included in agriculture.
- u. Includes imputed rent on owner occupied farm dwellings.
- v. Includes transportation and distribution of agricultural products.
- w. Electric light and power included in manufacturing.
- x. Transportation and public utilities included in manufacturing.
- y. Gross of purchases from other industries but net of depreciation.
- z. Includes private distribution and transportation of petroleum and its products.
- aa. Finance included in trade.
- bb. Includes all government services.
- cc. Manufacturing, mining, and construction included in "other services".
- dd. Included in "other services".
- ee. Included in transportation.

- ff. Transportation of consumers, entertainment, indirect taxes, net interest and dividends from abroad, and a deduction for government outlay on road maintenance included in other services.
- gg. Includes output of works canteens and banking and credit operations servicing material production.
- hh. Transportation only.
- ii. Includes income from foreign trading.
- jj. Construction included in "other services".
- kk. Includes all government services in 1950-52.
- ll. Banking, other finance, insurance, and business and legal service included in trade.
- mm. Trade excludes small middlemen and peddlers.
- nn. Manufacturing and construction included in transportation.
- oo. Includes missions.
- pp. Includes social service.
- qq. Communication included in government
- rr. Services and professions included in trade.
- ss. Includes small part of private service income.
- tt. Includes public construction.
- uu. Includes all public enterprises except transportation, public utilities, and communication.

gnp: gross national product
gdp: gross domestic product
ndp: net domestic product
ni: national income
nnp: net national product
nmp: net material product
gni: gross national income

APPENDIX TABLE 2

National Product, Current Prices, Percentage Distribution by Industry, Long-Term Series

A Denmark--Net Domestic Product

	Agriculture (1)	All Other (2)
1870-79	45.1	54.9
1880-89	36.9	63.1
1890-99	31.2	68.8
1900-09	29.1	70.9
1905-14	29.1	70.9
1915-20	21.3	78.7
1921-29	22.5	77.5
1930-39	17.3	82.7
1940-46	19.6	80.4
1947-52	19.2	80.8

Source: Kjeld Bjerke, "The National Product of Denmark, 1870-1952", Income and Wealth, Series V, International Association for Research in Income and Wealth, England, 1956, Table X, p. 147.

B France--National Product

	Agricul., forestry, & fish. (1)	Mining, mfg., & constr. (2)	All other (100.0 - col. 1 & col. 2) (3)	Trade (4)	Prof. services (5)	Public adminis. (6)	Other services (7)
1 1789	49	18	33	12	5	9	7
2 1815	51	22	27	7	4	11	5
3 1825	48	26	26	7	3	11	4
4 1835	51	25	25	8	3	10	4
5 1847	44	29	27	7	2	12	5
6 1859	45	30	25	7	2	11	5
7 1872	43	30	27	7	2	12	5
8 1882	41	30	28	7	2	14	5
9 1892	37	32	30	7	3	13	8
10 1898	37	34	29	7	3	12	8
11 1908-10	35	37	28	7	3	11	7
12 1920-22	26	31	43				
13 1924-28	20	43	37				
14 1929-33	20	44	36				
15 1934-38	22	40	38				
16 1949	23	46	31				

Lines 1-11: Current price data from François Perroux, "Prise de Vues sur la Croissance de l'Economie Française, 1780-1950", Income and Wealth, Series V, Table II, p. 61.

Lines 12-16: 1938 price data from Jean Bédard, Vue Sur L'Economie et La Population de la France Jusqu'en 1970, Paris, 1953, p. 224.

C Germany--National Product

	Agriculture (1)	Industry exclu- ding handicrafts (2)	All other (100.0 col. 1 & col. 2) (3)
Territory of the German Reich before 1913			
1860-69	32.3	24.0	43.7
1865-74	30.2	31.1	38.7
1870-79	27.2	32.6	40.2
1875-84	24.3	26.7	49.0
1880-89	22.0	24.3	53.7
1885-94	19.6	25.0	55.4
1890-99	17.0	28.0	55.0
1895-1904	15.8	33.8	51.4
1900-09	17.6	37.8	44.6
1905-14	18.0	38.8	43.2

Territory of the German Reich of 1925

1925-34	13.4	42.0	44.6
1930-38	13.7	44.0	42.3

Territory of the Bundesrepublik of 1950

1936	12.5	42.4	45.1
1949	10.4	43.7	45.9
1950	11.0	45.9	43.1
1951	11.1	51.3	37.6
1952	10.9	50.8	38.3

Source: Paul Jostock, "The Long-Term Growth of National Income in Germany",
Income and Wealth, Series V, Table VIII, p. 106.

D Netherlands--National Product

	Agricul., forestry, & fish. (1)	Industry (2)	All other (100.0 - col. 1 & col. 2) (3)	Transp. (4)	Trade (5)	Public adminis. (6)	Other services (7)
1 1789	49	18	33	12	5	9	7
2 1815	51	22	27	7	4	11	
1 1913	16.3	26.7	57.0	6.2	14.4		36.4
2 1921	12.8	30.3	56.9	10.5	10.9	4.0	31.5
3 1929-31	9.4	32.1	58.5	10.2	12.3	3.6	32.4
4 1938	7.0	30.0	63.0	10.0	11.0	8.0	34.0
5 1947-54	12.8	40.8	46.4		21.2	9.5	15.7

Line 1: Netherlands Central Bureau of Statistics, Berekeningen over het nationale inkomen van Nederland voor de periode 1900-20, Table 5, p. 15.

Lines 2 and 3: Netherlands Central Bureau of Statistics, Het Nationale Inkomen van Nederland, 1921-1939, Table 31, p. 37. Manufacturing includes electric, gas, and water services; transportation includes hotels and restaurants.

Lines 4 and 5: Netherlands Central Bureau of Statistics, Nationale Rekeningen 1954, Table 12, p. 90. Averages of percentages for 1947-54. Manufacturing includes electric, gas, and water services; government includes education.

E Norway--Gross Domestic Product

	Agricul., forestry, fishing (1)	Mining, mfg., constr. (2)	All other (100.0 - col. 1 & col. 2) (3)	Transp. & pub. util. (4)	Trade & finance (5)	Gov't. (6)	Other services (7)
1910	23.5	25.0	51.5	12.2	17.6	1.5	20.2
1930	16.6	27.4	56.0	15.4	16.9	2.0	21.7
1950	13.7	37.5	48.8	18.3	15.2	2.4	12.9

Source: Central Bureau of Statistics of Norway, National Accounts, 1900-1929, Oslo, 1953, Table 18, p. 134.

F Sweden--Gross Domestic Product

	Agricul., forestry, fishing (1)	Mfg., mining, constr. (2)	All other (100.0 - col. 1 & col. 2) (3)	Transp. & pub. util. (4)	Trade & finance (5)	Gov't. (6)	Other services (7)
1869-71	43.4	15.7	40.9	4.4	3.7	32.8	
1879-81	40.0	18.8	41.2	5.8	4.3	31.0	
1889-91	35.2	22.1	42.7	6.9	4.4	31.5	
1899-1901	29.1	31.7	39.2	7.1	3.7	28.4	
1909-11	26.1	35.6	38.3	7.8	4.0	26.5	
1919-21	24.2	37.4	38.4	9.2	5.4	23.9	
1929-31	15.4	41.3	43.3	10.6	5.5	27.1	
1939-41	13.0	44.7	42.3	10.2	8.1	23.9	
1944-46	12.2	46.7	41.1	10.2	7.6	23.2	
1949-51	12.9	49.9	37.2	8.8	7.1	21.3	

Source: Olof Lindahl, The Gross Domestic Product of Sweden, 1861-1951, Stockholm, 1956, Table 1.

G United Kingdom--National Income

	Agricul. (1)	Mining & mfg. (2)	All other (100.0 - col. 1 & col. 2) (3)	Transp. (4)	Trade (5)	Gov't. (6)	Other services (7)
1 1895	9.7	36.9	53.4	11.9	11.3	3.6	26.6
2 1911	8.0	39.3	52.7	5.2 ^a		47.5	
3 1924	3.4	49.2	47.4	5.2 ^a		42.2	
4 1930	3.8	45.4	50.8	4.7 ^a		46.1	
5 1934	4.1	49.3	46.6	4.4 ^a		42.2	
6 1948-54	5.6	46.2	48.2	10.0	12.8	6.5	19.0

Line 1: From Michael G. Mulhall, Industries and Wealth of Nations, London, 1896, p. 95.

Lines 2-5: From Colin Clark, National Income and Outlay, London, 1937, Table 106, p. 238.

Line 6: From Appendix Table 1.

a. Railways only. Other transportation included with other services.

H Italy--Gross National Product

	Agricul., forestry, fishing (1)	Mining, mfg., constr., elec. & gass (2)	All other (100.0 - col. 1 & col. 2) (3)	Government (4)	Other services (5)
1862-65	57.1	20.0	22.9	4.3	18.6
1866-70	56.6	20.5	22.9	4.8	18.1
1871-75	57.3	19.8	22.9	4.2	18.8
1876-80	55.7	19.6	24.7	4.1	20.6
1881-85	48.4	21.5	30.1	5.4	24.7
1886-90	48.6	20.6	30.8	5.6	25.2
1891-95	46.7	21.0	32.3	5.7	26.7
1896-1900	45.8	22.4	31.8	4.7	27.1
1901-05	45.3	23.4	31.3	5.5	25.8
1906-10	42.9	26.0	31.1	5.2	26.0
1911-15	41.8	25.9	32.3	7.0	25.4
1916-20	43.4	27.5	29.1	6.9	22.2
1921-25	39.0	28.3	32.7	9.4	23.3
1926-30	32.5	30.6	36.9	9.2	27.7
1931-35	27.7	28.9	43.4	13.7	29.6
1936-40	26.7	30.6	42.7	12.1	30.7
1941-45	44.2	24.3	31.4	9.5	22.0
1946-50	32.2	36.5	31.3	8.5	22.8
1950-54	26.4	39.1	34.5		

Source: Benedetto Barberi, "The Economic Growth of Italy, 1862-1954", mimeographed paper, prepared for the 1955 meeting of the International Association for Research in Income and Wealth, held at Hindsø, Denmark, Table 3; except for 1950-54 for which data are from Appendix Table 1.

I Hungary--Net National Product

	Agricul. (1)	Mining, mfg., constr. (2)	All other (100.0 - col. 1 & col. 2) (3)	Transp. (4)	Trade (5)	Other services (6)
1899-1901	49.0	22.8	28.2		6.2	22.0
1911-13	57.0	26.5	16.5	5.8	4.5	6.2
1920/21	48.7	30.8	20.5	a	5.0	15.5 ^a
1928/29-1931/32 ^b	35.8	30.2	34.0	6.7	5.8	21.5
1939/40-1942/43 ^b	27.1	37.6	35.3	a	6.1	29.2 ^a

Source: Alexander Eckstein, "National Income and Capital Formation in Hungary, 1900-1950", Income and Wealth, Series V, Table I, p. 165.

a. Transportation included with other services.

b. Percentages of averages.

J Japan--National Income

	Ohkawa's Estimates			Yamada's Estimates		
	Primary (1)	Secondary (2)	Tertiary (3)	Primary (4)	Secondary (5)	Tertiary (6)
1878-82	64.6	10.6	24.8	38.0	17.6	44.4
1883-87	54.8	14.6	30.6	32.2	18.0	49.8
1888-92	54.3	16.2	29.5	35.6	19.0	45.4
1893-97	51.3	18.7	30.0	34.3	21.3	44.4
1898-1902	48.5	21.9	29.6	34.2	23.6	42.2
1903-07	46.0	20.7	33.3	39.7	23.5	36.8
1908-12	42.4	21.5	36.1	37.3	25.3	37.4
1913-17	36.2	27.0	36.8	32.8	31.2	36.0
1918-22	34.2	25.8	40.0	32.3	28.5	39.2
1923-27	27.8	24.8	47.4	23.3	27.5	49.2
1928-32	21.8	27.7	50.5	19.9	30.7	49.4
1933-37	19.6	32.4	47.9	18.3	33.2	48.5
1938-42	17.1	40.9	42.0	16.6	41.1	42.3
1947-54	24.4	31.5	44.1			

Source: Yuzo Yamada, "Notes on Income Growth and the Rate of Saving in Japan", Income and Wealth, Series V, Table V, p. 229, except for 1947-54, for which data are from Appendix Table 1.

K Union of South Africa--National Income

	Agricul.	Mining, & constr.	All other (100.0 - col. 1 & col. 2)	Transp.	Trade	Gov't incl. defense	Other services
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 1911/12	16.1	34.3	49.6	7.6	13.7	7.0	21.3
2 1919/20-							
1922/23 ^a	19.4	30.1	50.5	6.7	15.0	10.5	18.3
3 1944/45	11.7	34.2	54.1	5.1	13.3	18.6	17.1

Lines 1 & 2: From S. Herbert Frankel, "An Analysis of the Growth of the National Income of the Union in the Period of Prosperity before the War", South African Journal of Economics, June 1944.

Line 3: From S. Herbert Frankel, "Consumption, Investment, and War Expenditure in Relation to National Income", ibid., September 1946.

a. Averages of percentages.

L Canada--National Product

Canada--National Product.			All other				
	Agricul., Mining, forestry, mfg., & fishing constr.	(100.0 - col. 1 & col. 2)	Transp. & pub. util.	Gov't	Other services	Adjust- ment	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 1870	44.6	23.8	31.6				+12.4
2 1880	42.8	24.2	33.0				+11.4
3 1890	35.1	29.7	35.2				+8.6
4 1900	33.1	28.4	38.5				+9.1
5 1910	27.5	30.4	42.1				+8.2
6 1920	24.0	32.0	44.0				+8.4
7 1930	13.1	31.7	55.2	12.6	9.6	39.6	-6.6
8 1945	14.0	33.8	52.2	11.0	18.0	24.9	-1.7
9 1950-53	14.0	39.3	46.7	10.4	8.7	29.4	-1.8

Source: O. J. Firestone, "Canada's Economic Development, 1867-1952", to be published by the International Association for Research in Income and Wealth. Lines 1-6: Gross national product.

Lines 7-9: Net national income. Line 9 is average of percentages.

Column 7: Rent, indirect taxes less subsidies, and net investment income for 1870-1920 and income of non-residents for 1930 and later years.

M United States--National Income

	Agricul.	Mining mfg., & constr.	All other (100.0 - col. 1 & col. 2)	Transp. & pub. util.	Trade	Gov't	Other services
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1869-79	20.5	21.0	58.5	11.9	15.7	4.4	26.4
1879-89	16.1	24.2	59.7	11.9	16.6	4.9	26.2
1889-99	17.1	25.6	57.3	10.7	16.8	6.0	23.8
1899-1908	16.7	26.0	57.3	10.7	15.3	5.6	25.6
1904-13	17.0	26.5	56.5	11.0	15.0	5.4	25.1
1914-23	15.2	28.5	56.3	11.0	14.0	7.9	23.3
1924-33	8.7	25.7	65.6	10.4	13.3	11.8	30.1
1934-43	9.2	28.8	62.0	8.5	13.2	15.4	24.8
1947-54	7.2	37.7	55.1	8.5	17.9	10.7	18.0

Source: Simon Kuznets, "Long-Term Changes in the National Income of the United States of America Since 1870", Income and Wealth, Series II, International Association for Research in Income and Wealth (Bowes & Bowes, England, 1952), Table 14, p. 89, except for 1947-54 for which data are from Appendix Table 1.

N Australia--National Income

	Agriculture, forestry, fishing (1)	Mining & manufac. ^a (2)	All other (100.0 - col. 1 & col. 2) (3)
1 1891	36.8	17.8	45.4
2 1901	27.4	22.8	49.8
3 1911	24.9	20.3	54.7
4 1921	24.2	19.7	56.0
5 1933	21.5	18.5	60.0
6 1939	16.9	21.9	61.2

Source: Colin Clark, Conditions of Economic Progress, p. 451.

a. Large-scale.

O New Zealand--National Income

1 1901	47.4	17.5	35.1
2 1926	35.7	12.9	51.4
3 1936	35.0	11.9	53.1

Lines 1-3: Ibid., p. 451.

a. Large-scale.

APPENDIX TABLE 3

Labor Force, Percentage Distribution by Industry, Recent Years

Region and Country	Date (1)	Agric., forestry, fishing (2)	Mining, mfg., constr. (3)	All other (4)	Transp., commun., pub. util. (5)	Trade & defense services (6)	Pub. admin. (7)	Other services (8)
<u>I Europe</u>								
<u>A Western, Northern, and Central</u>								
1 Austria	(a) 1951	32.1	36.2	31.7	6.1	8.8	16.8	
	(b) 1951	19.6	43.2	37.2	7.4	10.0	19.9	
	(c) 1939	39.0	32.4	28.6	5.2	7.5 ^o	15.9 ^o	
4 Belgium	(a) 1947 ^a	12.5	50.1	37.4	7.2 ^p	13.8	16.5 ^p	
	(b) 1947 ^a	9.2	52.7	38.1	7.5 ^p	13.4	17.2 ^p	
	(c) 1930 ^b	17.0	47.8	35.2	6.8	14.5 ^q	13.9	
7 Denmark	(d) 1930 ^b	11.8	51.8	36.4	7.4	13.6 ^q	15.4	
	(a) 1950	25.1	32.7	42.2	7.3	13.5	21.3	
	(b) 1950	22.2	34.3	43.5	7.7	13.5	22.4	
10	(c) 1940	28.5	30.2	41.3	6.3	12.2	22.8	
	(d) 1940	25.7	31.5	42.8	6.6	12.2	24.0	
	(a) 1950	46.0	27.2	26.8	5.9	8.1	12.9	
13 Finland	(b) 1950	31.7	34.6	33.7	7.5	9.9	16.4	
	(c) 1940 ^b	57.4	18.5	24.1	3.6	5.5	5.1	10.4
	(d) 1940 ^b	39.4	26.1	34.5	5.2	7.7	7.6	14.0
16 France	(a) 1946	36.5	28.6	34.9	6.3	11.8	16.9	
	(c) 1936	35.6	30.9	33.5	5.1	13.3 ^r	6.5	8.6 ^r
	(a) 1950	23.2	41.6	35.2	6.2	10.0	19.1	
18 Germany, F. R.	(b) 1950	12.6	47.7	39.7	7.2	10.7	21.8	
	(a) 1951	39.6	23.6	36.8	5.5	11.1	20.2	
	(b) 1951	30.5	27.3	42.2	6.4	12.5	23.4	
20 Ireland	(c) 1936	48.4	15.1	36.5	5.1	7.8 ^o	2.3	21.3 ^o
	(d) 1936	37.5	18.3	44.2	6.3	8.9 ^o	2.9	26.0 ^o

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
24 Netherlands	(a) 1947a	19.7	32.9	47.4	7.3	14.3		25.8
25	(b) 1947a	14.5	35.9	49.6	8.0	13.4		28.2
26	(c) 1930	20.6	38.8	40.6	9.3	14.0 ^r		17.3
27 Norway	(a) 1950	25.9	35.7	38.4	10.9	10.8		16.7
28	(b) 1950	22.7	37.3	40.0	11.3	11.3		17.4
29	(c) 1930 ^{bc}	35.4	25.3	39.3	9.9	10.8		18.6
30	(d) 1930 ^{bc}	30.6	27.1	42.3	10.6	11.6		19.9
31 Sweden	(a) 1950	20.4	39.7	39.9	9.0	13.2		17.8
32	(b) 1950	18.0	40.9	41.1	9.3	13.4		18.4
33	(c) 1940	28.8	35.7	35.5	6.7	13.6		15.2
34	(d) 1940	23.9	38.1	38.0	7.2	14.3		16.5
35 United Kingdom including North Ireland	(a) 1951	5.2	47.3	47.5	9.3	14.0		24.1
36 United Kingdom excluding North Ireland	(a) 1951	4.9	47.4	47.7	9.4	14.1		24.1
37	(b) 1951	4.9	47.5	47.6	9.4	14.0		24.2
38	(c) 1931	6.0	46.1	47.9	6.9	15.8 ^r	7.7	17.5 ^r
39	(d) 1931	5.5	46.3	48.2	6.9	15.9	7.8	17.6
40 Germany, Eastern	(a) 1946	29.2	41.2	29.6	5.9	7.9		15.7
41	(b) 1946	21.7	45.9	32.4	6.6	8.3		17.5
42	(c) 1939	26.0	41.5	32.5	5.5	10.0 ^o	10.1	7.0 ^o
43	(d) 1939	14.4	48.6	37.0	6.5	10.7 ^o	12.0	7.7 ^o
44 Switzerland	(a) 1950	16.5	46.6	36.9	4.5	11.7		20.7
45	(b) 1950	12.6	48.9	38.5	4.8	12.1		21.6
46	(c) 1941	20.8	43.6	35.6	3.9	9.9		21.8
47	(d) 1941	16.2	46.2	37.6	4.1	10.3		23.2
B Southern								
48 Italy	(a) 1954 ^d	41.2	30.5	28.3	4.6	10.6		13.1
49	(b) 1954 ^d	33.9	34.9	31.2	5.3	10.7		15.2
50	(c) 1936	48.2	27.7	24.1	3.8 ^s	8.7 ^o		11.5 ^{os}
51	(d) 1936	37.1	34.1	28.8	4.8 ^s	9.4 ^o		14.6 ^{os}

52	Portugal	(a) 1950	48.4	24.7	26.9	3.8	7.3	15.9
53		(b) 1950	45.9	25.7	28.4	4.0	7.6	16.8
54		(c) 1940	48.8	20.7	30.5	2.9	6.3	5.6
55		(d) 1940	46.2	21.8	32.0	3.1	6.6	15.7
56	Spain	(a) 1950	48.8	24.6	26.6	4.4	6.5	14.7
57		(c) 1940	51.7 ^b	23.5	24.8	3.7	6.4	14.7
<u>C Eastern</u>								
58	Bulgaria	(c) 1934 ^b	80.0	8.0	12.0	1.2	2.3 ^r	2.2
59		(d) 1934 ^b	57.6	16.6	25.8	2.8	4.8 ^r	4.8
60	Hungary	(c) 1941 ^b	47.8	24.7	27.5	3.1	5.8 ^r	18.6 ^r
61		(d) 1941 ^b	40.2	28.4	31.4	3.6	6.4 ^r	21.5 ^r
62	Poland	(c) 1931 ^{be}	65.0	16.9	18.1	2.3	5.40	2.0
63		(d) 1931 ^{be}	51.7	26.1	22.2	3.6	7.40	3.2
64	U.S.S.R.	(c) 1939	57.8	17.2	25.0	5.4	4.40	15.2
65	Yugoslavia	(a) 1953	66.8	15.4	17.8	2.1 ^s	3.1	12.6 ^s
66		(b) 1953	51.3	23.6	25.1	3.2 ^s	4.7	17.1 ^s
67		(c) 1931	78.7	11.1	10.2	1.6	2.6 ^r	6.0 ^r
68		(d) 1931	62.5	19.4	18.1	2.8	4.5 ^r	10.8 ^r
69	Czechoslovakia	(a) 1947	37.7	37.3	25.0	4.9	6.4	13.6
70		(b) 1947	23.3	46.1	30.6	6.1	7.7	16.7
71		(c) 1930	37.0	37.1	25.9	4.2	8.30	13.20
72		(d) 1930	27.1	43.2	29.7	4.9	9.00	15.70
73	Estonia	(c) 1934 ^b	67.0	15.5	17.5	2.6	4.5	10.5
74		(d) 1934 ^b	49.9	23.5	26.6	4.0	6.5	16.3
75	Latvia	(c) 1935	67.2	14.7	18.1	2.2	5.7	3.4
76		(d) 1935	49.1	22.8	28.1	3.5	8.3	5.3
<u>II Asia</u>								
77	Ceylon	(b) 1946 ^{df}	52.9	10.3 ^g	36.8 ^g	3.6	7.8	25.3 ^t
78	India	(b) 1951 ^h	70.6	10.7	18.7	2.3	5.8	10.4
79		(c) 1931 ^{bci}	70.9	11.1	18.0	1.7	5.6 ^q	1.3
80	Israel	(a) 1948	12.0	30.6	57.4	6.5	11.1	39.9

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
81 Japan	(a) 1950a	48.4	21.4	30.2	5.1	11.8		13.3
82	(b) 1950a	28.7	30.2	41.1	7.6	14.2		19.3
83	(c) 1930b	49.6	20.1	30.3	3.7	15.1		11.5
84 Pakistan	(a) 1951j	76.5	7.3	16.2	1.4	5.1		9.7
85	(b) 1951j	76.8	7.1	16.1	1.4	5.1		9.6
86 Philippines	(a) 1948d	71.3	8.8	19.9	2.0	5.0		13.0
87	(b) 1948d	62.2	11.6	26.2	2.6	6.5		17.1
88	(c) 1939	72.9	10.6	16.5	3.3	5.2	0.8	7.2
89 Thailand	(a) 1947	84.8	2.3	12.9	0.8	7.9		4.3
90	(c) 1937b	88.6	2.2	9.2	0.8	4.5	1.5	2.3
91 Turkey	(a) 1950	85.7	7.4	6.9	0.8	0.7		5.3
92	(c) 1935b	81.8	8.3	9.9	1.5	2.8		5.6
<u>III Africa</u>								
93 Belgian Congo	(a) 1952	84.9	6.5	8.6	1.1	1.2		6.3
94	(b) 1952	21.6	33.6	44.8	5.8	6.2		32.6
95 Egypt	(a) 1947	59.7	10.9	29.4	3.2	8.6 ^u		17.7
96	(b) 1947	52.4	12.7	34.9	3.8	9.6 ^u		21.6
97	(c) 1937	70.7	10.0	19.3	2.3	7.5	2.8	6.7
98 Union of South Africa	(a) 1946a	48.3	20.2	31.5	4.4	5.0		22.1
99 Algeria	(a) 1948	80.8	6.4	12.8	1.9	4.8		6.0
100 French Morocco	(a) 1952	67.1	11.8	21.1	8.3 ^v	5.1		7.6 ^v
<u>IV Northern America</u>								
101 Canada	(a) 1951	19.1	34.3	46.6	8.8	16.2		21.7
102	(b) 1951	16.8	35.4	47.8	9.1	16.5		22.2
103	(c) 1941d	26.3	27.4	46.3	6.2	11.9		28.2
104	(d) 1941d	23.1	30.5	46.4	6.9	13.1		26.3
105 United States	(a) 1950d	12.2	34.7	53.1	8.3	18.5		26.3
106	(b) 1950d	10.9	35.3	53.8	8.5	18.7		26.7
107	(c) 1940d	17.9	32.7	49.4	7.2	16.4		25.9
108	(d) 1940d	16.1	33.6	50.3	7.3	16.5		26.5

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
143 Costa Rica	(a) 1950	55.0	15.5	29.5	4.1	7.7		17.7
144	(b) 1950	51.0	16.7	32.3	4.5	8.2		19.6
145 Venezuela	(a) 1950	41.3	18.0	40.7	3.4	8.8		28.5
146	(b) 1950	36.9	19.3	43.8	3.7	9.3		30.7
147	(c) 1941	51.3	18.4	30.3	3.6	8.1		18.6
<u>VI Oceania</u>								
148 Australia	(a) 1947	15.6	35.2 ⁿ	49.2 ⁿ	8.9 ⁿ	15.1		25.2
149	(b) 1947	15.0	35.4 ⁿ	49.6 ⁿ	9.0 ⁿ	15.2		25.4
150	(c) 1939	20.5	22.2	57.3	8.4	17.6 ^o		31.3 ^o
151	(c) 1933	20.8	33.1	46.1	7.9	15.9 ^r		22.2 ^r
152	(d) 1933	19.9	33.6	46.5	8.0	16.1 ^r		22.4 ^r
153 New Zealand	(a) 1951	18.4	33.5	48.1	11.6	16.5		20.1
154	(b) 1951	18.2	33.6	48.2	11.7	16.5		20.1
155	(c) 1936	27.2	24.4	48.4	9.6	15.5 ^o		23.3 ^o
156	(d) 1936	26.1	24.9	49.0	9.8	15.7 ^o		23.7 ^o

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Notes to Appendix Table 3

- Sources: U. N. Demographic Yearbook, 1955, for all lines (a) and (b) except line 80, which is from unpublished data in the files of the Statistical Office of the United Nations; and lines 48, 49, 89, 91, 93, 94, 98, and 129, which are from the I. L. O. Yearbook of Labour Statistics, 1955.
- I. L. O. Yearbook of Labour Statistics, 1953, for lines 10, 11, 46, 47, 54-57, 79, 97, 118-120, 132, 133, 136, 138, 139, 142.
- I. L. O. Yearbook of Labour Statistics, 1951-52, for lines 14, 15, 50, 51, 103, 104, 115.
- I. L. O. Yearbook of Labour Statistics, 1949-50, for lines 3, 6, 7, 88, 90.
- I. L. O. Yearbook of Labour Statistics, 1947-48, for lines 17, 22, 23, 58-61, 92, 107, 108.
- I. L. O. Yearbook of Labour Statistics, 1945-46, for lines 71, 72, 83.
- I. L. O. Yearbook of Labour Statistics, 1943-44, for lines 73-76.
- U. N. Demographic Yearbook 1949/50, for lines 29, 30, 38, 39, 67, 68.
- U. N. Demographic Yearbook 1948, for lines 26, 33, 34, 42, 43, 62, 63, 151, 152, 155, 156.
- Colin Clark, Conditions of Economic Progress, 2nd ed., London, 1951, pp. 42 and 451, for lines 64 and 150.

Lines (a) and (c): Including unpaid family labor.

Lines (b) and (d): Excluding unpaid family labor.

- a. Excludes unemployed not classified by industry.
- b. Occupational classification.
- c. Excludes "inadequately described".
- d. Excludes persons seeking work for first time.
- e. Excludes "not specified".
- f. Excludes part-time employment.
- g. Electric, gas, and water included with manufacturing.
- h. Self-supporting only; excludes earning dependents and unclassified.
- i. British India, the Indian states, and Burma.
- j. Excludes unemployed, armed forces, and foreigners.
- k. Mining included with agriculture.
- l. Excludes persons unemployed for 13 weeks or more, who were not classified by industry.
- m. Trade included in manufacturing.
- n. Water and sanitary services included in manufacturing.
- o. Banking and insurance included in trade.
- p. Storage included in "other services".
- q. Finance and hotels included in trade.
- r. Banking included in trade.
- s. Electric, gas, and water included in "other services".
- t. Includes miscellaneous laborers not classified by industry--about 8 percent of total.
- u. Includes house owners.
- v. Water and sanitary service included in "other services".
- w. Transportation, communication, and public utilities included in "other services".

APPENDIX TABLE 4

Labor Force, Percentage Distribution by Industry, Long-Term Series

A Austria

	A (1)	M (2)	S (3)	T+C (4)	OS (5)
1869	48	28	24	7	17
1880	50	28	22	6	16
1890	43	30	27	9	19
1900	39	30	31	10	21
1910	41	35	24	13	12

Excludes women in agriculture.

Source: Colin Clark, Conditions of Economic Progress, 2nd ed., London, 1951, p. 415.

B Belgium

1880	25	39	36	10	27
1890	18	41	41	13	27
1900	17	44	39	16	23
1910	18	50	32	19	13
1920	16	50	34	19	15
1930	14	49	37	22	15
1947	11	50	39	21	19

Excludes women in agriculture.

Source: Ibid., p. 411, for 1880-1930. For 1947 from the U.N. Demographic Yearbook, 1955.

C Denmark

	A (1)	Non-A (2)
1870-79	51.2	48.8
1880-89	48.8	51.2
1890-99	45.4	54.6
1900-09	41.4	58.6
1905-14	40.0	60.0
1915-20	38.2	61.8
1921-29	35.9	64.1
1930-39	30.2	69.8
1940-46	26.7	73.3
1947-52	23.1	76.9

Source: Kjeld Bjerke, op. cit., Table II.

	A (1)	M (2)	S (3)	T (4)	C (5)	OS (6)
1870	54	24	22			
1880	52	24	24			
1890	47	26	27			
1901	42	28	30		13	17
1911	37	28	35	5	12	19
1921	32	29	39	6	12	22
1930	31	30	39	6	11	22
1940	29	33	38	6	13	19

Excludes women in agriculture.

Source: Colin Clark, op. cit., p. 418 for 1901 and later years, extrapolated to 1870 by Kjeld Bjerke, op. cit.

D Finland

	A (1)	M (2)	S (3)	T (4)	C (5)	OS (6)
1880	79	9	12	2	2	8
1890	76	11	13	3	2	7
1900	72	15	13	3	3	7
1910	70	17	13	4	3	6
1920	63	20	17	4	5	8
1930	57	23	20	5	6	10
1940	47	28	25	5	7	13

Excludes women in agriculture.

Source: Colin Clark, op. cit., p. 416.

E France

	A	M	S
	(1)	(2)	(3)
1 1788	75	10	15
2 1827	63	37	
3 1845	62	18	20
4 1856	53	29	19
5 1866	52	29	20
6 1876	53	26	21
7 1886	48	25	27
8 1896	49	28	23
9 1906	43	32	25
10 1921	42	33	25
11 1926	39	36	25
12 1931	36	36	27
13 1936	36	34	30
14 1950A	34	33	33
15 1950B	32	36	32

	A	M	S	T+C	OS
	(1)	(2)	(3)	(4)	(5)
16 1866	43	38	19	8	11
17 1901	33	42	25	11	14
18 1921	29	36	35	19	15
19 1931	24	41	35	19	16
20 1946	21	35	44	23	22

Lower panel excludes women in agriculture.

Lines 1 & 3: "La Croissance Economique Francaise", Income and Wealth, Series III, International Association for Research in Income and Wealth, London, 1953.

Lines 2, 16-20: Colin Clark, op. cit., p. 409.

Lines 4-7: de Foville's estimates given in François Simiand, Le Salaire, L'Evolution Sociale et La Monnaie, Paris, 1932.

Lines 8-15: Jean Bénard, op. cit.

F Germany

	A	M	S	T+C	OS
	(1)	(2)	(3)	(4)	(5)
1 1882	42	36	22	8	14
2 1895	36	39	25	11	14
3 1907	34	40	26	14	12
4 1925	30	42	28	16	12
5 1933	29	41	30	18	12
6 1939	27	41	32		
7 1950	23	44	33		
8 1882	34	44	22	7	14
9 1895	29	48	23	9	14
10 1907	24	51	25	12	14
11 1925	18	49	33	17	16
12 1933	17	47	36	18	18

Lower Panel excludes women from agriculture.

Lines 1-5: Statistisches Jahrbuch für das Deutsche Reich, 1938.

Lines 6 & 7: For the western republic, Ibid., 1954.

Lines 8-12: Colin Clark, op. cit., p. 413.

G Ireland

1 1841	51	34	15	3	11
2 1851	47	34	19	5	13
3 1861	43	34	23	6	17
4 1871	41	33	26	7	19
5 1881	42	28	30	7	23
6 1901	44	28	28	9	19
7 1911	43	29	28	10	18
8 1926	48	19	33	17	16
9 1951	31	27	42	19	23

Lines 1-8: Colin Clark, op. cit., p. 409.

Line 9: From Appendix Table 3.

H Netherlands

	A (1)	M (2)	S (3)	T (4)	C (5)	OS (6)
1 1909	28	35	37	8	11	17
2 1920	24	38	38	10	12	17
3 1930	21	39	40	9	14	17
4 1947	19	33	48	6	14	27
	A (1)	M (2)	S (3)	T+C (4)	OS (5)	
5 1899	29	36	35	18	18	
6 1909	25	37	38	20	17	
7 1920	21	40	39	22	17	
8 1930	18	41	41	24	17	
9 1938	18	36	46	26	20	

Lower panel excludes women in agriculture.

Lines 1-4: L. of N. Statistical Yearbook, I. L. O. Yearbook of Labour Statistics, and U. N. Statistical Yearbook.

Lines 5-9: Colin Clark, op. cit., p. 412.

I Norway

	A (1)	M (2)	S (3)	T (4)	C (5)	OS (6)
1 1875	59	19	22	7	4	10
2 1890	55	22	23	7	6	10
3 1900	47	27	26	8	8	11
4 1910	47	25	28	8	9	12
5 1920	42	28	30	8	11	12
6 1930	41	25	34	9	12	13
7 1946	34	32	34	10	12	13
8 1950	29	35	36	11	12	12
9 1875	49	24	27	9	5	13
10 1890	45	27	28	9	7	12
11 1900	37	32	31	9	9	14
12 1910	37	30	33	9	10	14
13 1920	34	31	35	9	12	14
14 1930	34	28	38	10	12	16
15 1939	39	23	38	8	16	14

Lower panel excludes women in agriculture.

Lines 1-8: Economic Survey, 1900-1950, Oslo, 1955, Table 7.

Lines 9-15: Colin Clark, op. cit., p. 415.

J Sweden

	A (1)	M (2)	S (3)	T+C (4)	OS (5)	
1 1870	72	15	13	5	8	
2 1880	68	17	15	7	7	
3 1890	62	22	16	9	7	
4 1900	55	28	17	10	7	
5 1910	49	32	19	13	6	
6 1920	44	35	21	15	6	
7 1930	39	36	25	18	7	
8 1940	34	38	28	20	8	
9 1945	30	40	30	21	10	
	A (1)	M (2)	S (3)	T (4)	C (5)	OS (6)
10 1910	46	26	28	5	6	17
11 1920	41	31	28	6	8	14
12 1930	36	32	32	7	11	14
13 1940	29	36	35	7	14	15
14 1945	24	38	38	8	14	16
15 1950	20	41	39	8	13	18
	A (1)	M (2)	S (3)	T+C (4)	OS (5)	
16 1751	70	5	25			
17 1840	71	6	23			
18 1870	63	10	27	4	22	
19 1887	60	12	28	5	22	
20 1890	56	16	28	6	21	
21 1900	50	21	29	8	20	
22 1910	44	28	28	12	17	
23 1920	35	35	30	16	14	
24 1930	31	35	34	17	16	
25 1940	27	37	36	19	17	

Top panel covers total population including dependents.

Middle panel covers labor force.

Bottom panel excludes women in agriculture.

Lines 1-6: Ingvar Svennilson, Wages in Sweden, 1860-1930, London, 1933.

Lines 7-9: W. S. and E. S. Woytinsky, World Population and Production, 1953.

Lines 10-15: L. of N. Statistical Yearbook, I. L. O. Yearbook of Labor Statistics, and U.N. Statistical Yearbook.

Lines 16-25: Colin Clark, op. cit., p. 417.

K United Kingdom

	A (1)	M (2)	S (3)
1 1891	15	54	31
2 1911	12	43	45
3 1924	6	44	50
4 1930	6	43	51
5 1934	5	41	54
6 1951	5	47	48

England and Wales

	A (1)	M (2)	S (3)	T (4)	C (5)	OS (6)
7 11841	23	45	32	3	5	24
8 1851	22	48	30	4	6	20
9 1861	19	48	33	5	7	21
10 1871	15	49	36	5	8	22
11 1881	12	49	39	6	9	23
12 1891	10	49	41	8	10	23
13 1901	9	47	44	8	11	25
14 1911	8	46	46	8	13	24
15 1921	7	50	43	8	13	23

Great Britain

16 1881	13	50	37	6	9	23
17 1891	11	40	40	8	10	22
18 1901	9	47	44	9	11	23
19 1911	8	47	45	8	12	24
20 1921	7	50	43	8	13	23
21 1931	6	47	47	8	16	23
22 1938	6	46	48	8	17	23

Line 1: Michael G. Mulhall, Industries and Wealth of Nations, London, 1896.

Lines 2-5: Colin Clark, National Income and Outlay, London, 1937.

Line 6: Appendix Table 3.

Lines 7-22: Colin Clark, Conditions of Economic Progress, 2nd ed., p. 408.

L Switzerland

1888	33	45	22	3	5	14
1900	27	48	25	4	6	15
1910	22	49	29	5	7	17
1920	22	47	31	5	8	18
1930	19	46	35	5	10	20
1941	20	46	34	4	11	19

Excludes women in agriculture.

Source: Colin Clark, op. cit., p. 412.

M Italy

	A (1)	M (2)	S (3)	T (4)	C (5)	OS (6)
1 1861	62	25	13		5	8
2 1871	62	24	14		5	9
3 1881	57	28	15		6	9
4 1901	59	24	16		8	8
5 1911	56	27	17		8	9
6 1921	56	25	19	4	6	9
7 1931	47	31	22		13	9
8 1936	48	29	23		13	10
9 1954	41	31	28	5	11	13
10 1871	52	34	14	2	22	11
11 1881	46	38	16	3	2	12
12 1901	49	31	20	4	5	11
13 1911	46	33	21	4	7	10
14 1921	47	30	23	5	8	10
15 1931	42	34	24	5	9	10
16 1936	40	33	27	4	8	15

Lower panel excludes women in agriculture.

Lines 1-5, 7, 8: F Coppola d'Anna, Popolazione, Reddito e Finanze, Rome, 1946.

Line 6: L. of N. Statistical Yearbook.

Line 9: Appendix Table 3.

Lines 10-16: Colin Clark, op. cit., p. 414.

N Portugal

1890	65	19	16	2	4	10
1911	58	22	20	3	6	11
1930	56	21	23	3	6	14

Excludes women "members of family assisting" in all trades.

Source: Colin Clark, op. cit., p. 398.

O Spain

1 1900	67	14	19	2	2	15
2 1910	65	15	20	2	2	16
3 1920	59	18	22	3	5	14
4 1930	53	20	28	4	6	18
5 1950	49	25	27	4	7	16
6 1887	69	15	16	2	3	11
7 1920	59	22	19	3	5	11
8 1930	47	31	22	3	6	13

Lines 1-4: La Renta Nacional de España, Madrid, 1945.

Line 5: Appendix Table 3.

Lines 6-8: Colin Clark, op. cit., p. 398.

P Hungary

	A (1)	M (2)	S (3)	T (4)	C (5)	OS (6)
1900	59	17	24	2	4	18
1910	56	19	24	3	4	17
1920	58	18	24	3	5	15
1930	54	22	24	3	6	16
1941	50	23	27	3	6	18

Source: Alexander Eckstein, "National Income and Capital Formation in Hungary, 1900-1950", Income and Wealth, Series V, Table V, p. 182.

Q Yugoslavia

	A (1)	M (2)	S (3)	T+C (4)	OS (5)
1895	60	17	23	12	11
1900	54	17	29	12	16
1921	75	13	12	5	6
1931	72	16	12	6	7

Excludes women in agriculture.

Source: Colin Clark, op. cit., p. 419.

R India

	51	32	17	5	12
1881	51	32	17	5	12
1911	63	16	21	10	11
1921	64	15	21	10	12
1931	64	14	22	9	14

Excludes women in agriculture.

Source: Ibid., p. 422.

S Japan

	A (1)	M (2)	S (3)	T (4)	C (5)	OS (6)
1 1877 & 1882	83	6	11			
2 1882 & 1887	79	8	12			
3 1887 & 1892	76	10	13			
4 1892 & 1897	73	12	15			
5 1897 & 1902	70	14	16			
6 1902 & 1907	67	16	18			
7 1907 & 1912	63	18	19			
8 1912 & 1917	60	19	21			
9 1920	54	21	25			
10 1922 & 1927	51	23	26			
11 1930	50	21	30			
12 1940	42	26	32			
13 1950	48	21	30			
14 1872	85	5	10	1	6	4
15 1887	78	9	13	1	7	5
16 1897	72	13	15	1	8	6
17 1912	62	18	20	3	10	7
18 1920	55	22	23	4	12	8
19 1930	52	19	29	4	16	9
20 1936	45	24	31	4	15	12

Lines 1-8, 10: International Labour Review, October 1930.

Lines 9, 11, 12: Irene B. Taeuber, "Population and Labor Force in the Industrialization of Japan, 1850-1950", Economic Growth: Brazil, India, Japan, edited by Simon Kuznets, W. E. Moore, and J. J. Spengler, Durham, N.C., 1955.

Line 13: Appendix Table 3.

Lines 14-20: Colin Clark, op. cit., p. 425.

T Union of South Africa

1911	59	16	25	1	2	22
1921	70	13	17	2	3	13
1946	47	20	33	4	5	24

Source: L. of N. Statistical Yearbook and I. L. O. Yearbook of Labour Statistics.

U Canada

	A (1)	M (2)	S (3)	T (4)	C (5)	OS (6)
1 1871	50 ^a	13 ^b	37			
2 1881	51	30	19			
3 1891	48	27	24			
4 1901	43	30	28			
5 1911	37	29	33			
6 1921	35	28	37			
7 1931	31	18	51			
8 1945	27	32	41			
9 1950-53	21	35	44			
10 1881	52	28	20			
11 1891	50	26	24	4	7	13
12 1901	44	28	28	5	9	14
13 1911	40	27	33	9	11	13
14 1921	38	27	35			
15 1931	33	28	39	8	13	18
16 1941	29	32	41	7	14	20

Lines 1-9: O. J. Firestone, "Canada's Economic Development, 1867-1953", to be published by the International Association for Research in Income and Wealth.

Lines 10-16: Colin Clark, *op. cit.*, p. 405, for 1901 and later years, extrapolated to 1881 by Firestone series.

a. Agriculture only.

b. Manufacturing only.

V United States

	A (1)	M (2)	S (3)	T (4)	C (5)	OS (6)
1 1870	50	25	25	4	6	15
2 1880	50	25	25	4	7	15
3 1890	42	28	30	5	8	17
4 1900	37	30	33	5	8	20
5 1910	31	31	38	7	9	22
6 1920	27	34	39	7	10	22
7 1930	22	31	47	7	12	28
8 1940	17	31	52	5	13	34
9 1950	12	35	53	8	19	26
10 1820	72	12	16		3	13
11 1830	71	14	15		3	13
12 1840	69	15	16		4	13
13 1850	65	18	17		5	12
14 1860	60	20	20		8	12
15 1870	54	23	23	4	7	12
16 1880	50	25	25	4	8	13
17 1890	43	27	30	5	10	15
18 1900	38	28	34	6	12	16
19 1910	32	32	36	6	13	17
20 1920	28	34	38	6	15	17
21 1930	22	32	46	7	18	21
22 1940	19	32	49	6	19	24

Lines 1-8: Simon Kuznets, "Long-Term Changes in the National Income of the United States of America", Income and Wealth Series II.

Line 9: Appendix Table 3.

Lines 10-22: Colin Clark, op. cit., p. 404.

W Brazil

	A (1)	Non-A (2)
1872	78	22
1920	69	31
1940	65	35
1950	58	42

Source: Ovidio de Andrada Junior, "Contribucao ao Estudo das Abinidades Economicas da Populacao Brasileira", Estadistica, March 1955.

X Cuba

	A (1)	M (2)	S (3)	T C (4)	OS (5)
1 1899	48	15	37	13	24
2 1907	48	16	36	18	18
3 1919	49	20	31	16	15
4 1943	41	15	44		

Lines 1 & 2: U. S. Bureau of the Census, Cuba--Population, History, and Resources, 1907, Washington, 1909, p. 216. Mining included in agriculture.

Line 3: L. of N., Statistical Yearbook, 1929.

Line 4: U. N. Demographic Yearbook, 1949-50.

Y Mexico

1900	70	20	10	6	4
1910	68	21	11	6	5
1921	71	12	17	7	10
1930	70	14	15	7	8
1940	65	13	22	12	10
1950	58	16	26	11	16

Source: Emilio Uribe Romo, "La Fuerza de Trabajo de Mexico: Un Analisis de su Estructura, Sus Caracteristicas y su Evolucion", Estadistica, June 1955.

Z Puerto Rico

1899	63	7	30	7	23
1910	61	14	25	9	16
1920	60	17	23	9	14
1930	52	22	26	11	14
1940	45	23	32	14	18
1948	39	24	37	17	21

Source: Harvey S. Perloff, Puerto Rico's Economic Future, Chicago, 1950.

A' Australia

	A (1)	M (2)	S (3)	T (4)	C (5)	OS (6)
1 1891	26	23	50			
2 1901	25	24	50			
3 1911	25	21	54			
4 1921	23	20	58			
5 1933	25	21	54			
6 1939	20	22	57			
7 1871	37	33	30	4	7	19
8 1881	33	36	31	4	8	19
9 1891	26	36	38	7	11	20
10 1901	25	34	41	7	13	20
11 1911	25	34	41	8	15	18
12 1921	23	34	43	9	15	19
13 1933	22	35	43	8	17	18

Lines 1-6: Colin Clark, op. cit., p. 451. Small-scale manufacturing included with services.

Lines 7-13: Ibid., p. 428.

B' New Zealand

1 1901	30	17	54			
2 1926	24	17	59			
3 1936	25	16	59			
4 1874	31	41	29	7	5	17
5 1881	32	38	30	7	6	17
6 1891	30	36	34	6	11	17
7 1901	30	33	37	7	13	17
8 1911	27	31	42	9	16	17
9 1921	27	27	46	11	16	19
10 1936	25	29	46	10	16	20

Lines 1-3: Ibid., p. 451. Small-scale manufacturing included with services.

Lines 4-10: Ibid., p. 430.

APPENDIX TABLE 5

Product per Worker, Major Industries, Recent Years

(Industry entries are relatives of countrywide product per worker, based on current prices)

Country	Dates		A (1)	Non-A (2)	$\frac{A}{\text{Non-A}}$ (3)	M (4)	S (5)	$\frac{M}{S}$ (6)	T+C (7)	OS (8)	$\frac{T+C}{OS}$ (9)
	LF	I									
I Europe											
A Western, Northern & Central											
1 Austria	(a) 1951	1948-54	0.49	1.24	0.40	1.36	1.11	1.23	1.14	1.08	1.06
2	(b) 1951	1948-54	0.80	1.05	0.76	1.14	0.95	1.20	0.98	0.91	1.08
3 Belgium	(a) 1947	1948-54	0.66	1.05	0.63	0.85	1.32	0.64	0.97	1.75	0.55
4	(b) 1947	1948-54	0.89	1.01	0.88	0.81	1.29	0.63	0.98	1.68	0.58
5 Denmark	(a) 1950	1947-54	0.82	1.06	0.77	1.07	1.05	1.02	1.33	0.78	1.71
6	(b) 1950	1947-54	0.93	1.02	0.91	1.02	1.02	1.00	1.30	0.75	1.73
7	(c) 1940	1938	0.78	1.09	0.72	1.09	1.08	1.01	1.32	0.89	1.48
8	(d) 1940	1938	0.87	1.05	0.83	1.05	1.04	1.01	1.30	0.85	1.53
9 Finland	(a) 1950	1948-54	0.57	1.37	0.42	1.51	1.23	1.23	1.35	1.09	1.24
10	(b) 1950	1948-54	0.82	1.08	0.76	1.19	0.98	1.21	1.09	0.85	1.28
11	(c) 1940	1938	0.62	1.52	0.41	1.61	1.44	1.12	1.95	1.13	1.73
12	(d) 1940	1938	0.90	1.07	0.84	1.14	1.01	1.13	1.37	0.79	1.73
13 France	(a) 1946	1947-49	0.47	1.31	0.36	1.31	1.30	1.01	1.19	1.41	0.84
14	(c) 1936	1938	0.63	1.20	0.52	1.10	1.30	0.85	1.36	1.24	1.10
15 Germany, F. R.	(a) 1950	1948-54	0.50	1.15	0.44	1.29	0.99	1.30	1.09	0.88	1.24
16	(b) 1950	1948-54	0.93	1.01	0.92	1.12	0.87	1.29	0.99	0.78	1.27
17 Ireland	(a) 1951	1947-54	0.82	1.12	0.73	1.05	1.16	0.91	0.99	1.29	0.77
18	(b) 1951	1947-54	1.07	0.97	1.10	0.91	1.01	0.90	0.87	1.12	0.78
19	(c) 1936	1938	0.53	1.44	0.37						
20	(d) 1936	1938	0.68	1.19	0.57						

21	Netherlands	(a) 1947	1947-54	0.66	1.08	0.61	1.25	0.97	1.29	0.96	0.97	0.99
22		(b) 1947	1947-54	0.90	1.02	0.88	1.14	0.93	1.23	0.97	0.89	1.09
23		(c) 1930	1938	0.36	1.16	0.31	0.74	1.57	0.47	0.99	2.35	0.42
24	Norway	(a) 1950	1947-54	0.58	1.15	0.50	1.14	1.15	0.99	1.25	1.01	1.24
25		(b) 1950	1947-54	0.66	1.10	0.60	1.09	1.10	0.99	1.20	0.97	1.24
26		(c) 1930	1938	0.42	1.32	0.32	1.25	1.37	0.91	1.45	1.27	1.14
27		(d) 1930	1938	0.48	1.23	0.39	1.16	1.27	0.91	1.36	1.19	1.14
28	Sweden	(a) 1950	1949-51	0.63	1.09	0.58	1.26	0.93	1.35			
29		(b) 1950	1949-51	0.72	1.06	0.68	1.22	0.91	1.34			
30	United Kingdom	(a) 1951	1948-54	1.08	1.00	1.08	0.98	1.02	0.96	0.98	1.06	0.92
<u>B Southern</u>												
31	Italy	(a) 1954	1950-54	0.64	1.25	0.51	1.28	1.22	1.05	1.41	1.00	1.41
32		(b) 1954	1950-54	0.78	1.11	0.70	1.12	1.11	1.01	1.34	0.86	1.56
33		(c) 1936	1938	0.58	1.39	0.42	1.01	1.82	0.55	1.42	2.26	0.53
34		(d) 1936	1938	0.76	1.14	0.67	0.82	1.52	0.54	1.25	1.78	0.70
35	Portugal	(a) 1950	1947-54	0.60	1.38	0.43	1.46	1.30	1.12			
36		(b) 1950	1947-54	0.63	1.31	0.48	1.40	1.23	1.14			
37		(c) 1940	1938	0.52	1.46	0.36	1.76	1.25	1.41			
38		(d) 1940	1938	0.55	1.38	0.40	1.67	1.19	1.40			
<u>C Eastern</u>												
39	Bulgaria	(c) 1934	1939-40	0.52	2.90	0.18	2.21	3.37	0.66	5.51	2.51	2.20
40		(d) 1934	1939-40	0.73	1.37	0.53	1.07	1.57	0.68	2.54	1.15	2.21
41	Hungary	(c) 1941	1938-39	0.71	1.27	0.56	1.53	1.03	1.49			
42		(d) 1941	1938-39	0.84	1.11	0.77	1.33	0.90	1.48			
43	U.S.S.R.	(c) 1939	1938	0.45	1.76	0.26	1.16	2.16	0.54			
44	Yugoslavia	(a) 1953	1952-53	0.43	2.14	0.20	3.36	1.09	3.08	2.29	0.60	3.82
45		(b) 1953	1952-53	0.56	1.46	0.38	2.19	0.77	2.84	1.51	0.44	3.43
<u>II Asia</u>												
46	Ceylon	(b) 1946	1947	1.03	0.96	1.07	0.83	1.00	0.83	0.93	1.04	0.89
47	India	(b) 1951	1948-53	0.71	1.70	0.42	1.59	1.77	0.90	2.12	1.54	1.38

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
48 Israel	(a) 1948 1952-53	1.02	1.00	0.88	1.06	0.83	1.20	0.99	1.21
49 Japan	(a) 1950 1947-54	0.50	1.47	1.47	1.46	1.01	1.39	1.55	0.90
50	(b) 1950 1947-54	0.85	1.06	0.80	1.07	0.97	1.08	1.07	1.01
51	(c) 1930 1938	0.40	1.59	0.25	1.72	1.15	1.25	1.91	0.65
52 Pakistan	(a) 1951 1949-53	0.79	1.69	0.47	0.93	0.46	1.95	2.08	0.94
53	(b) 1951 1949-53	0.79	1.71	0.46	0.96	0.47	1.95	2.10	0.93
54 Philippines	(a) 1948 1947-53	0.57	2.07	0.28	2.05	0.98	2.20	2.02	1.09
55	(b) 1948 1947-53	0.65	1.57	0.41	1.55	0.98	1.69	1.53	1.10
56	(c) 1939 1938	0.40	2.60	0.15	3.92	2.24	1.87	1.64	1.14
57 Thailand	(a) 1947 1947-53	0.64	3.02	0.21	6.48	2.70	2.03	3.09	0.66
58	(c) 1937 1938	0.51	4.77	0.11	5.95	1.33	5.74	2.87	2.00
59 Turkey	(a) 1950 1948-54	0.57	3.60	0.16	2.20	0.43	11.33	3.43	3.30
60	(c) 1935 1938	0.58	2.90	0.20	2.02	0.56	3.79	3.50	1.08
III Africa									
61 Belgian Congo	(a) 1952 1950-54	0.39	4.44	0.09	5.09	1.29	7.26	2.73	2.66
62	(b) 1952 1950-54	1.53	0.85	1.80	0.99	1.30	1.39	0.53	2.62
63 Egypt	(a) 1947 1950-53	0.58	1.62	0.36	0.97	0.52	1.78	1.90	0.94
64	(b) 1947 1950-53	0.66	1.37	0.48	0.83	0.53	1.57	1.56	1.01
65	(c) 1937 1938-39	0.69	1.74	0.40	0.79	0.35	1.02	3.48	0.29
66 Union of S. Africa	(a) 1946 1947-54	0.32	1.64	0.20	1.76	1.13	2.39	1.19	2.01
IV Northern America									
67 Canada	(a) 1951 1948-54	0.68	1.08	0.63	1.14	1.03	0.99	1.06	0.93
68	(b) 1951 1948-54	0.77	1.05	0.73	1.10	1.00	0.97	1.04	0.93
69	(c) 1941 1938	0.50	1.18	0.42	1.23	1.15	1.38	1.00	1.38
70	(d) 1941 1938	0.57	1.13	0.50	1.10	1.14	1.24	1.08	1.15
71 United States	(a) 1950 1947-54	0.59	1.06	0.56	1.09	1.04	0.99	1.09	0.91
72	(b) 1950 1947-54	0.66	1.04	0.63	1.07	1.02	0.97	1.07	0.91
73	(c) 1940 1938	0.49	1.11	0.44	0.84	1.29	1.18	1.38	0.86
74	(d) 1940 1938	0.55	1.09	0.50	0.82	1.27	1.17	1.35	0.87
V Latin America									
75 Argentina	(a) 1947 1947-54	0.72	1.09	0.66	1.04	1.13	1.42	0.91	1.56
76	(b) 1947 1947-54	0.76	1.07	0.71	1.02	1.11	1.41	0.90	1.57

75	Argentina	(a) 1947	1947-54	0.72	1.07	0.66	1.04	1.13	0.92	1.42	0.91	1.56
76		(b) 1947	1947-54	0.76	1.07	0.71	1.02	1.11	0.92	1.41	0.90	1.57
77	Bolivia	(a) 1950	1948-50	0.77	1.59	0.48	1.22	1.93	0.63	0.84	3.62	0.23
78		(b) 1950	1948-50	0.99	1.01	0.98	0.78	1.22	0.64	0.54	2.16	0.25
79	Brazil	(a) 1950	1947-53	0.56	1.67	0.34	1.42	1.80	0.79	1.95	1.70	1.15
80		(b) 1950	1947-53	0.64	1.42	0.45	1.19	1.53	0.78	1.66	1.45	1.14
81	Chile	(a) 1952	1947-52	0.55	1.19	0.46	1.01	1.32	0.77	1.45	1.24	1.17
82		(b) 1952	1947-52	0.57	1.18	0.48	0.98	1.32	0.74	1.43	1.26	1.13
83		(c) 1940	1940	0.51	1.27	0.40	1.05	1.42	0.74	1.78	1.22	1.46
84	Ecuador	(a) 1950	1950-53	0.81	1.19	0.68	0.78	1.64	0.48	2.00	1.45	1.38
85		(b) 1950	1950-53	0.86	1.12	0.77	0.75	1.53	0.49	1.84	1.36	1.35
86	El Salvador	(a) 1950	1950	0.84	1.28	0.66	0.81	1.58	0.51	2.53	1.14	2.22
87		(b) 1950	1950	0.90	1.14	0.79	0.73	1.40	0.52	2.28	1.00	2.28
88	Haiti	(a) 1950	1951/52	0.86	1.79	0.48						
89		(b) 1950	1951/52	0.97	1.09	0.89						
90	Honduras	(a) 1950	1947-52	0.67	2.65	0.25	1.45	3.57	0.41	7.00	2.41	2.90
91		(b) 1950	1947-52	0.75	1.70	0.44	0.95	2.28	0.42	4.80	1.50	3.20
92	Jamaica	(a) 1943	1943, 1946	0.51	1.41	0.36	1.16	1.53	0.76			
93	Mexico	(a) 1950	1947-50	0.32	1.95	0.16	1.55	2.18	0.71	3.33	1.32	2.52
94		(b) 1950	1947-50	0.35	1.78	0.20	1.42	1.99	0.71	3.13	1.18	2.65
95		(c) 1940	1939	0.31	2.30	0.13	1.89	2.54	0.74	2.52	2.57	0.98
96		(d) 1940	1939	0.31	2.25	0.14	1.85	2.48	0.75	2.48	2.47	1.00
97	Nicaragua	(a) 1950	1950	0.60	1.84	0.33	1.66	1.99	0.83	2.30	1.80	1.28
98		(b) 1950	1950	0.62	1.72	0.36	1.57	1.86	0.84	2.14	1.69	1.27
99	Paraguay	(a) 1950	1950-54	0.86	1.17	0.74	0.94	1.34	0.70	1.67	1.14	1.46
100	Peru	(c) 1940	1942	0.57	1.72	0.33	1.18	2.28	0.52			
101		(d) 1940	1942	0.61	1.55	0.39	1.08	2.01	0.54			
102	Puerto Rico	(a) 1950	1947-53	0.53	1.28	0.41	0.72	1.59	0.45	1.46	1.69	0.86
103		(b) 1950	1947-53	0.55	1.25	0.44	0.71	1.56	0.46	1.44	1.65	0.87
104		(c) 1940	1942	0.68	1.26	0.54	0.53	1.81	0.29	1.26	2.24	0.56
VI Oceania												
105	Australia	(c) 1939	1939	0.82	1.05	0.78	0.99	1.07	0.93			
106	New Zealand	(a) 1951	1948-53	1.56	0.87	1.79	0.88	0.87	1.01			
107		(b) 1951	1948-53	1.58	0.87	1.82	0.88	0.87	1.01			

Based on Appendix Tables 1 and 3.

Lines (a) and (c): including unpaid family labor.

Lines (b) and (d): excluding unpaid family labor.

APPENDIX TABLE 6

Product per Worker, Major Industries, Long-Term Series

(Industry entries are relatives of countrywide product per worker, based on current prices)

A Denmark

Dates		A	Non-A	A Non-A
Labor Force	National Product			
		(1)	(2)	(3)
	1870-79	0.88	1.12	0.79
	1880-89	0.76	1.23	0.62
	1890-99	0.69	1.26	0.55
	1900-09	0.70	1.21	0.58
	1905-14	0.73	1.18	0.62
	1915-20	0.56	1.27	0.44
	1921-29	0.63	1.21	0.52
	1930-39	0.57	1.18	0.48
	1940-46	0.73	1.10	0.66
	1947-52	0.83	1.05	0.79

B France

Dates		A	Non-A	A Non-A	M	S	M S
Labor Force	National Product						
		(1)	(2)	(3)	(4)	(5)	(6)
1788	1789	0.66	2.03	0.33	1.84	2.16	0.85
1827	1815, 1825, 1835	0.80	1.35	0.59			
1845	1835, 1847, 1859	0.75	1.40	0.54	1.54	1.28	1.20
1856	1847, 1859	0.85	1.17	0.73	1.01	1.44	0.70
1866	1859, 1872	0.85	1.15	0.74	1.05	1.31	0.80
1876	1872, 1882	0.80	1.23	0.65	1.17	1.30	0.90
1886	1882, 1892	0.83	1.15	0.72	1.24	1.07	1.16
1896	1892, 1898	0.76	1.23	0.62	1.19	1.28	0.93
1906	1898, 1908-10	0.84	1.12	0.75	1.09	1.17	0.93
1921	1920-22	0.62	1.28	0.48	0.96	1.70	0.56
1926	1924-28	0.52	1.30	0.40	1.20	1.46	0.82
1931	1929-33	0.56	1.25	0.45	1.22	1.30	0.94
1936	1934-38	0.61	1.22	0.50	1.19	1.27	0.94
1950A	1949	0.68	1.17	0.58	1.39	0.94	1.48
1950B	1949	0.73	1.13	0.65	1.28	0.96	1.33

C Germany

Dates		A	Non-A	A Non-A	M	S	M S
Labor Force	National Product	(1)	(2)	(3)	(4)	(5)	(6)
1882	1880-89	0.52	1.35	0.39	0.68	2.42	0.28
1895	1890-99	0.47	1.30	0.36	0.72	2.22	0.32
1907	1905-14	0.53	1.24	0.43	0.97	1.65	0.59
1925	1925-34	0.44	1.24	0.35	0.99	1.63	0.61
1933	1930-38	0.48	1.21	0.40	1.08	1.38	0.78
1939	1936	0.46	1.20	0.38	1.03	1.42	0.73
1950	1949-51	0.47	1.16	0.41	1.06	1.31	0.81

D Netherlands

1909	1913	0.57	1.17	0.49	0.76	1.57	0.48
1920	1921	0.54	1.14	0.47	0.80	1.47	0.54
1930	1929-31	0.46	1.14	0.40	0.83	1.44	0.58
1947	1947-54	0.66	1.08	0.61	1.23	0.98	1.26

E Norway

1910		0.50	1.44	0.35	0.99	1.85	0.54
1930		0.40	1.41	0.28	1.08	1.66	0.65
1950		0.47	1.21	0.39	1.06	1.36	0.78

F Sweden

1870	1869-71	0.60	2.05	0.29	1.08	3.15	0.34
1880	1879-81	0.59	1.87	0.32	1.08	2.80	0.39
1890	1889-91	0.57	1.71	0.33	1.02	2.64	0.39
1900	1899-1901	0.53	1.58	0.34	1.14	2.29	0.50
1910	1909-11	0.53	1.44	0.37	1.11	1.99	0.56
1920	1919-21	0.55	1.35	0.41	1.07	1.83	0.58
1930	1929-31	0.39	1.40	0.28	1.16	1.74	0.67
1940	1939-41	0.38	1.32	0.29	1.17	1.53	0.76
1945	1944-46	0.41	1.25	0.33	1.18	1.34	0.88
1910	1909-11	0.56	1.37	0.41	1.39	1.36	1.02
1920	1919-21	0.59	1.28	0.46	1.20	1.36	0.88
1930	1929-31	0.43	1.32	0.33	1.29	1.36	0.95
1940	1939-41	0.45	1.22	0.37	1.25	1.19	1.05
1945	1944-46	0.50	1.16	0.43	1.23	1.09	1.13
1950	1949-51	0.64	1.09	0.59	1.23	0.95	1.29

Top panel is based on population dependent on specified industry.

G United Kingdom

Dates				A			M
Labor Force	National Product	A	Non-A	Non-A	M	S	M S
		(1)	(2)	(3)	(4)	(5)	(6)
1891	1895	0.64	1.06	0.60	0.69	1.71	0.40
	1911	0.68	1.04	0.65	0.91	1.17	0.78
	1924	0.56	1.03	0.54	1.12	0.95	1.18
	1930	0.69	1.02	0.68	1.07	0.98	1.09
	1934	0.80	1.01	0.79	1.19	0.87	1.37
1951	1948-54	1.08	1.00	1.08	0.98	1.02	0.96

H Italy

1861	1862-65	0.93	1.11	0.84	0.80	1.70	0.47
1871	1866-75	0.92	1.13	0.81	0.82	1.67	0.49
1881	1876-85	0.92	1.10	0.84	0.73	1.77	0.41
1901	1896-1905	0.77	1.34	0.57	0.95	1.92	0.49
1911	1906-15	0.76	1.30	0.58	0.94	1.87	0.50
1921	1916-25	0.72	1.36	0.53	1.14	1.63	0.70
1931	1926-35	0.65	1.31	0.50	0.97	1.77	0.55
1936	1931-40	0.56	1.41	0.40	1.02	1.91	0.53
1954	1950-54	0.64	1.25	0.51	1.28	1.22	1.05

I Hungary

1900	1899-1901	0.82	1.26	0.65	1.36	1.18	1.15
1910	1911-13	1.02	0.97	1.05	1.37	0.67	2.04
1920	1920/21	0.84	1.23	0.68	1.70	0.86	1.98
1930	1928/29-1931/32	0.66	1.40	0.47	1.39	1.41	0.99
1941	1939/40-1942/43	0.54	1.46	0.37	1.62	1.32	1.23

J-1 Japan, Yamada's Estimates

1887 & 1882	1878-82	0.46	3.56	0.13	2.75	4.04	0.68
1882 & 1887	1883-87	0.41	3.29	0.12	2.14	4.08	0.52
1887 & 1892	1888-92	0.47	2.73	0.17	1.86	3.39	0.55
1892 & 1897	1893-97	0.47	2.47	0.19	1.79	3.02	0.59
1897 & 1902	1898-1902	0.49	2.21	0.22	1.72	2.62	0.66
1902 & 1907	1903-07	0.59	1.82	0.32	1.51	2.10	0.72
1907 & 1912	1908-12	0.59	1.71	0.35	1.45	1.95	0.74
1912 & 1917	1913-17	0.55	1.66	0.33	1.61	1.71	0.94
1920	1918-22	0.60	1.47	0.41	1.36	1.56	0.87
1922 & 1927	1923-27	0.46	1.57	0.29	1.18	1.93	0.61
1930	1928-32	0.40	1.59	0.25	1.47	1.67	0.88
1940	1938-42	0.39	1.44	0.27	1.61	1.31	1.23
1950	1947-54	0.50	1.47	0.34	1.47	1.46	1.01

J-2 Japan, Ohkawa's Estimates

Dates		A					M
Labor Force	National Product	A (1)	Non-A (2)	Non-A (3)	M (4)	S (5)	$\frac{M}{S}$ (6)
1877 & 1882	1878-82	0.78	2.03	0.38	1.66	2.25	0.74
1882 & 1887	1883-87	0.69	2.19	0.32	1.74	2.51	0.69
1887 & 1892	1888-92	0.71	1.94	0.37	1.59	2.20	0.72
1892 & 1897	1893-97	0.70	1.83	0.38	1.57	2.04	0.77
1897 & 1902	1898-1902	0.69	1.73	0.40	1.60	1.84	0.87
1902 & 1907	1903-07	0.69	1.63	0.42	1.33	1.90	0.70
1907 & 1912	1908-12	0.67	1.57	0.43	1.23	1.88	0.65
1912 & 1917	1913-17	0.61	1.58	0.39	1.39	1.75	0.79
1920	1918-22	0.63	1.43	0.44	1.23	1.59	0.77
1922 & 1927	1923-27	0.54	1.48	0.36	1.06	1.86	0.57
1930	1928-32	0.44	1.55	0.28	1.33	1.71	0.78
1940	1938-42	0.41	1.43	0.29	1.60	1.30	1.23

K Union of South Africa

1911	1911/12	0.27	2.04	0.13	2.21	1.93	1.15
1921	1919/20-1922/23	0.28	2.65	0.11	2.39	2.84	0.84
1946	1944/45	0.25	1.66	0.15	1.69	1.64	1.03

L Canada

1881	1880	0.84	1.16	0.72	0.81	1.70	0.48
1891	1890	0.72	1.26	0.57	1.09	1.45	0.75
1901	1900	0.78	1.17	0.67	0.96	1.38	0.70
1911	1910	0.74	1.15	0.64	1.03	1.26	0.82
1921	1920	0.69	1.17	0.59	1.14	1.19	0.96
1931	1930	0.42	1.26	0.33	1.76	1.08	1.63
1945	1945	0.52	1.17	0.44	1.04	1.28	0.81
1950-53	1950-53	0.67	1.09	0.61	1.14	1.05	1.09

M United States

1870	1869 & 1879	0.41	1.58	0.26	0.85	2.29	0.37
1880	1869, 1879, 1889	0.37	1.62	0.23	0.91	2.30	0.40
1890	1879, 1889, 1899	0.39	1.44	0.27	0.89	1.96	0.45
1900	1889, 1899,						
	1899-1908	0.46	1.31	0.35	0.86	1.73	0.50
1910	1904-13	0.55	1.20	0.46	0.84	1.49	0.56
1920	1914-23	0.57	1.16	0.49	0.83	1.44	0.58
1930	1924-33	0.40	1.16	0.34	0.83	1.38	0.60
1940	1934-43	0.53	1.10	0.48	0.92	1.21	0.76
1950	1947-54	0.59	1.06	0.56	1.09	1.04	1.05

N Australia

<u>Dates</u>		A	Non-A	<u>A</u>	M	S	<u>M</u>
Labor Force	National Product			<u>Non-A</u>			<u>S</u>
		(1)	(2)	(3)	(4)	(5)	(6)
1891		1.39	0.86	1.62	0.76	0.90	0.84
1901		1.08	0.97	1.11	0.94	0.99	0.95
1911		1.00	1.00	1.00	0.97	1.01	0.96
1921		1.05	0.98	1.07	1.01	0.97	1.04
1933		0.87	1.04	0.84	0.89	1.10	0.81
1939		0.82	1.05	0.78	0.99	1.07	0.93

O New Zealand

1901	1.60	0.75	2.13	1.04	0.66	1.58
1926	1.48	0.85	1.74	0.78	0.87	0.90
1936	1.39	0.87	1.60	0.75	0.90	0.83

Based on Appendix Tables 2 and 4.

Appendix Table 7

Product per Worker, Service Industries, Long-Term Series
(Industry entries are relatives of country-wide product per worker, based on current prices)

A Netherlands

Dates		T+C	OS	$\frac{T+C}{OS}$
Labor Force	National Product			
		(1)	(2)	(3)
1909	1913	1.07	2.12	0.50
1920	1921	1.00	2.05	0.49
1930	1929-31	0.95	2.13	0.45
1947	1947-54	1.04	0.93	1.12

B Norway

1910	1.84	1.85	0.99
1930	1.55	1.84	0.84
1950	1.43	1.24	1.15

C Hungary

1900	1899-1901	1.00	1.25	0.80
1910	1911-13	1.37	0.36	3.81
1930	1928/29-1931/32	1.44	1.40	1.03

D Union of South Africa

1911	1911/12	6.26	1.27	4.93
1921	1919/20-1922/23	4.43	2.23	1.99
1946	1944/45	2.09	1.48	1.41

E United States

1870	1869 & 1879	2.73	1.99	1.37
1880	1869, 1879, 1889	2.72	2.02	1.35
1890	1879, 1889, 1899	2.26	1.75	1.29
1900	1889, 1899,			
	1899-1908	1.94	1.58	1.23
1910	1904-13	1.65	1.39	1.19
1920	1914-23	1.45	1.44	1.01
1930	1924-33	1.23	1.49	0.83
1940	1934-43	1.21	1.21	1.00

Appendix Table 8 Proportion of Labor Force to Total Population, Recent Years

	Date (1)	Total Population (millions) (2)	Labor Force as % of Population	
			Incl. unpaid family labor (3)	excl. unpaid family labor (4)
<u>I Europe</u>				
<u>A Western, Northern, & Central</u>				
1 Austria	1951	6.93	48.5	40.0
2 Belgium	1947	8.51	40.9	38.3
3 Denmark	1950	4.28	48.2	45.2
4 Finland	1950	4.03	49.2	38.5
5 France	1946	39.85	51.5	
6 Germany, F. R.	1950	47.70	46.3	39.6
7 Ireland	1951	2.96	43.0	36.9
8 Netherlands	1947	9.62	40.2	36.0
9 Norway	1950	3.28	42.3	40.6
10 Sweden	1950	7.04	44.1	42.4
11 United Kingdom	1951	50.22	46.2	
12 Switzerland	1950	4.72	45.7	42.9
<u>B Southern</u>				
13 Italy	1954	48.40	44.1	37.5
14 Portugal	1950	8.44	39.0	36.6
15 Spain	1950	27.98	38.6	
<u>C Eastern</u>				
16 Bulgaria	1934	6.08	56.5	25.6
17 Hungary	1941	9.32	48.4	41.8
18 Poland	1931	31.92	47.0	30.8
19 Yugoslavia	1953	16.93	46.3	29.9
20 Czechoslovakia	1947	12.16	48.1	38.4
21 Estonia	1934	1.13	59.1	38.1
22 Latvia	1935	1.95	61.1	38.4
<u>II Asia</u>				
23 Ceylon	1946	6.66		39.2 ^a
24 India	1951	356.63	39.5	
25 Japan	1950	83.20	43.6	28.6
26 Pakistan	1951	73.88	30.5 ^b	30.4 ^b
27 Philippines	1948	19.23	38.6	30.1
28 Thailand	1947	17.44	51.6	
29 Turkey	1950	20.95	60.7	
<u>III Africa</u>				
30 Belgian Congo	1953	12.03	50.6	9.7
31 Egypt	1947	18.97	37.6	30.5
32 Union of S. Africa	1946	11.42	45.2	
33 Algeria	1948	8.51	41.0	
34 French Morocco	1952	8.00	41.0	

	(1)	(2)	(3)	(4)
<u>IV Northern America</u>				
35 Canada	1951	13.98	37.9	36.7
36 United States	1950	150.70	39.8	39.0
<u>V Latin America</u>				
37 Argentina	1947	15.89	40.6	39.5
38 Bolivia	1950	2.70	50.0	24.0
39 Brazil	1950	51.94	33.0	27.4
40 Chile	1952	5.93	36.9	35.5
41 Colombia	1938	8.70	52.5	36.8
42 Ecuador	1950	3.20	38.6	35.5
43 El Salvador	1950	1.86	35.2	30.7
44 Haiti	1950	3.10	56.4	33.3
45 Honduras	1950	1.37	47.3	29.3
46 Jamaica	1943	1.24	40.8	
47 Mexico	1950	25.79	32.4	28.6
48 Nicaragua	1950	1.06	31.2	29.2
49 Paraguay	1950	1.33	32.9	
50 Peru	1940	6.21	39.9	34.5
51 Puerto Rico	1950	2.21	27.0	26.2
52 Venezuela	1950	5.04	33.9	31.1
<u>VI Oceania</u>				
53 Australia	1947	7.58	42.2	41.8
54 New Zealand	1951	1.94	38.2	38.0

Sources: See notes to Appendix Table 3. Since the original data showing the relation of labor force to population are sometimes different from those showing the relation of unpaid family labor to total labor force (because of adjustments for underenumeration, untabulated returns, etc., in one case or the other) column 4 was derived by applying to column 3 the ratio of labor force excluding unpaid family labor to total labor force.

a. Also excludes part-time workers and persons seeking work for first time.

b. Excludes unemployed.

APPENDIX TABLE 9
Classification of Countries by Economic Level Classes and Use in Text Tables

I: Including Unpaid Family Labor
E: Excluding Unpaid Family Labor
x: Used throughout table
*: Used in part of table
-: Not used

Econ. Level Class	International Comparison Tables										Long-Term Change Tables																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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